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Service Manual

ORDER NO.
CRT 1258

COMPACT DISC PLAYER

CDX-4 UC, EW

COMPACT disc DIGITAL AUDIO

Note:

- **See the separate manual CX-173 (CRT1161) for the CD mechanism description.**
- **Refer to the service manual CDX-M100 (CRT1136) for finding circuit description which are not shown in this manual.**

General

System	Compact disc audio system
Usable discs	Compact disc
Signal format	Sampling frequency: 44.1 kHz Number of quantization bits: 16, linear
Power source	14.4 V DC (10.8–15.6 V allowable)
Grounding system	Negative type
Power consumption	5.8 W
Maximum power consumption	11.5 W
Dimensions (chassis)	178(W) × 50(H) × 150(D) mm [7(W) × 2(H) × 5-7/8(D) in.]
(nose)	170(W) × 46(H) × 12(D) mm [6-3/4(W) × 1-3/4(H) × 1/2(D) in.]
Weight	1.4 kg (3.1 lbs.)

Audio

Frequency response	5–20,000 Hz (±1 dB)
Signal-to-noise ratio	92 dB (1 kHz) (IHF-A network)
Dynamic range	90 dB (1 kHz)
Output voltage	250 mV (1 kHz, 0 dB)
Number of channels	2 (stereo)

These specifications were determined and are presented in accordance with specification standards established by the Ad Hoc Committee of Car Stereo manufacturers.

Note:
Specifications and the design are subject to possible modification without notice due to improvements.

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• **CD Player Service Precautions**

1. Since these screws protects the mechanism during transport, be sure to affix it when it is transported for repair, etc.
2. For pickup unit (CGY1009) handling, please refer to "Disassembly" (Fig. 4) During replacement, handling precautions shall be taken to prevent an electrostatic discharge (protection by a short pin).
3. During disassembly, be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.

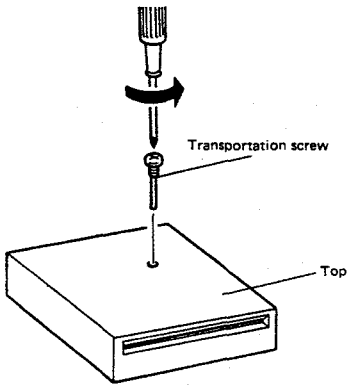
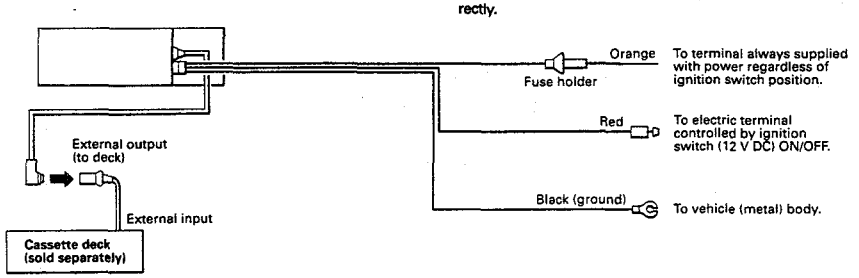


Fig. 1

1. CONNECTION

- Before making final connections, make temporary connections then operate the unit to check for any connecting cord problems.
- Refer to the instruction manual for details on connecting the various cords of the deck and main amp then make connections correctly.


Orange
Fuse holder
To terminal always supplied with power regardless of ignition switch position.
Red
To electric terminal controlled by ignition switch (12 V DC) ON/OFF.
External output (to deck)
External input
Black (ground)
To vehicle (metal) body.
Cassette deck (sold separately)

2. SAFETY INFORMATION (CDX-4/EW)

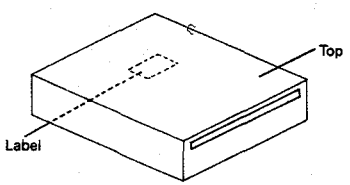
1. **Safety Precautions for those who Service this Unit.**

- Follow the adjustment steps (see pages 8 through 29) in the service manual when servicing this unit. When checking or adjusting the emitting power of the laser diode exercise caution in order to get safe, reliable results.

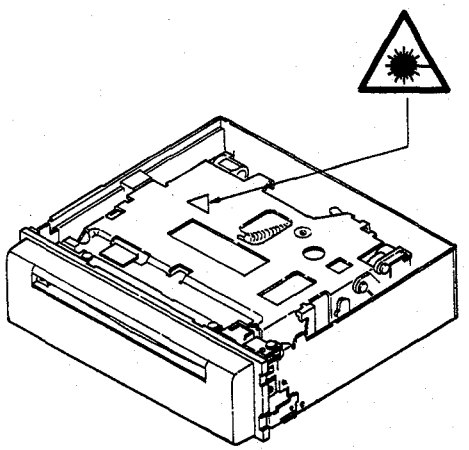
Caution:

1. **During repair or tests, minimum distance of 13cm from the focus lens must be kept.**
2. **During repair or tests, do not view laser beam for 10 seconds or longer.**

2. **A "CLASS 1 LASER PRODUCT" label is affixed to the bottom of the player.**



3. **The triangular label is attached to the mechanism unit plate unit.**



4. **Specifications of Laser Diode**

Specifications of laser radiation fields to which human access is possible during service.

Wavelength = 780 nanometers
Radiant power = 69.7 microwatts
(Through a circular aperture stop having a diameter of 80 millimeters)

0.55 microwatts
(Through a circular aperture stop having a diameter of 7 millimeters)

6.4 Tracking Offset Adjustment

● Purpose: To adjust the electrical offset of the tracking amplifier to zero

● Maladjustment symptoms: Search times too long, carriage run-away

● Measuring equipment/ jigs	• Oscilloscope
● Measuring point	• TAO low-pass filter output
● Test disc and setting	• No disc • Test mode
● Adjustment position	• VR352-3 (TO)

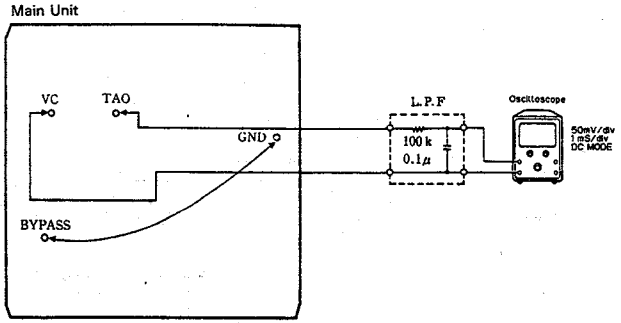


Fig. 12

Adjustment Procedure

1. Insert a low-pass filter between TAO and VC.
2. Check that BYPASS is connected to GND.
3. Switch regulator ON.
4. Using the oscilloscope, measure the TAO LPF output DC voltage in reference to VC, and adjust VR352-3 (TO) to obtain a reading of 0 ± 25mV.
   The low-pass filter may be left in place for later adjustments.

6.5 TE Offset Adjustment - I

● Purpose: To adjust the electrical offset of the tracking servo to zero.

● Maladjustment symptoms: Search times too long, carriage run-away

● Measuring equipment/ jigs	• DC voltmeter
● Measuring point	• TAO low-pass filter output
● Test disc and setting	• No disc • Test mode
● Adjustment position	• VR352-2 (TEO)

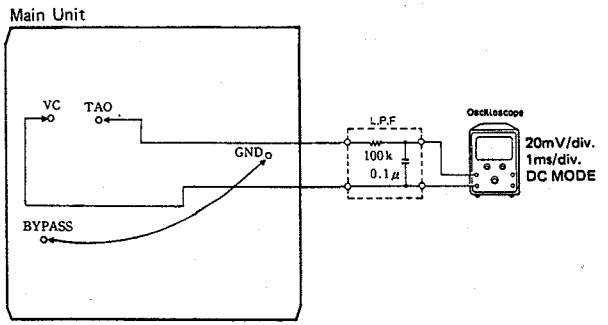


Fig. 13

Adjustment Procedure

1. Check that BYPASS is connected to GND.
2. Switch regulator ON while in test mode.
3. Press the SCAN key to close tracking.
4. Using VR352-2 (TEO), adjust the TAO LPF output DC voltage in reference to VC to a value of 0 ± 10mV.
5. Switch regulator OFF.

6.6 Tracking Balance Adjustment - I

● Purpose: To adjust the tracking servo offset to zero.

● Maladjustment symptoms: Search times too long, poor playability, carriage run-away

● Measuring equipment/ jigs	• Oscilloscope
● Measuring point	• TEY (Tracking error signal), low-pass filter output
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Test mode
● Adjustment position	• VR351-1 (T. BAL)

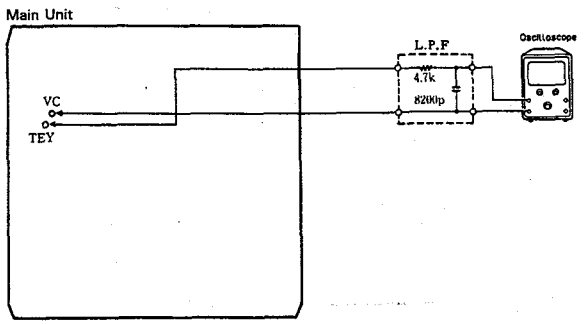
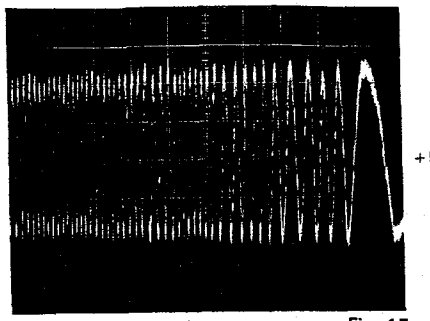


Fig. 14

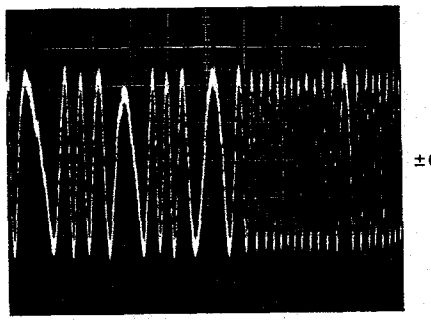
Adjustment Procedure

1. After checking that regulator is OFF, connect the low-pass filter as shown in the diagram.
2. Disconnect BYPASS from ground.
3. Load the test disc (SONY TYPE 4). Switch regulator ON.
4. Using the [FWD] or [REV] key, move the pick-up to about the center of the signal surface.
5. Press the [RPT/RANDOM] key to close focus.
6. Using an oscilloscope, observe the TEY signal in respect to VC. Then adjust VR351-1 (T.BAL) to set the positive and negative amplitudes to the same levels. (See Fig. 15-17)
7. Switch the power OFF.
   The low-pass filter may be left in place for later adjustments.



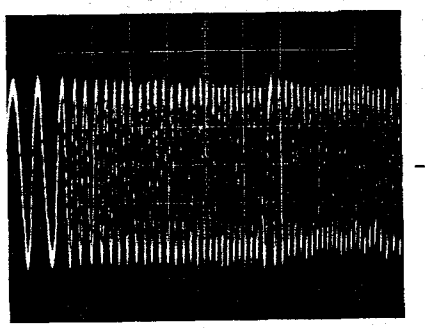
+5% NG

Fig. 15



±0% OK

Fig. 16



−5% NG

Fig. 17

10ms/div.
0.2V/div.
DC Mode

6.7 Tangential Skew Check

● Purpose: To check whether tangential skew has been misaligned or not when replacing the pick-up unit.

● Maladjustment symptoms: No disc playback; track jumping

● Measuring equipment/ jigs	• Oscilloscope, extension connectors, screwdriver
● Measuring point	• RFO
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Normal mode
● Adjustment position	• Pick-up tangential adjustment screw

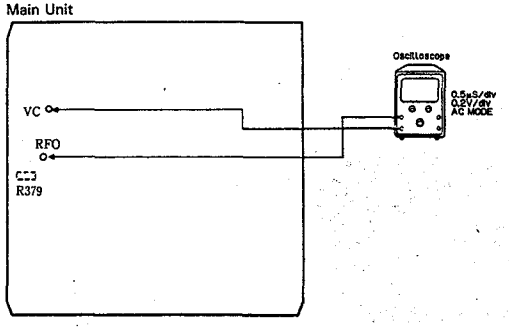


Fig. 18

Adjustment Procedure (with R379 removed)

1. Remove R379 (but reconnect after completing adjustment).
2. Play tune TNO 7 in normal mode. (TYPE 3: TNO 23)
3. Check that the valley at the 11T section of the RF waveform is flat.
4. If out of adjustment, readjust to obtain a flat RF waveform. (See Fig. 19-24)Take care not to knock the pick-up with the screwdriver at this stage. (This kind of accident can result in loss of focus.)
5. Switch the power OFF and reconnect R379.
6. Apply "screw-lock" to the tangential adjustment screw.
7. After adjusting tangential skew, also adjust the grating.
8. If tangential skew is seriously out of adjustment, carriage stopping and run-away tend to occur in normal mode. In this case,

a) Switch to test mode,

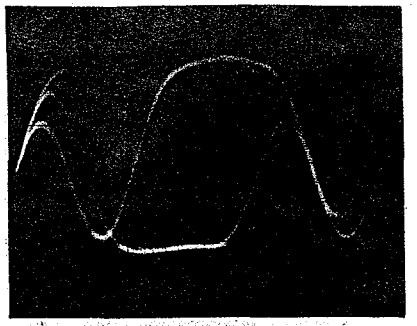
b) Shift the pick-up to signal surface center using [FWD] or [REV] key.

c) Press the [RPT/RANDOM] key to close focus.

d) Press the [SCAN] key to close the tracking.

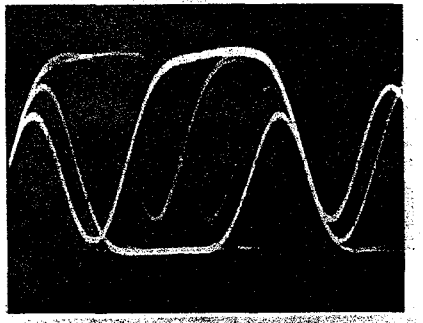
e) Observe RFO in respect to VC, and turn the tangential adjustment screw to obtain a flat waveform at the 11T section.

f) Repeat the adjustment resuming from step 2.



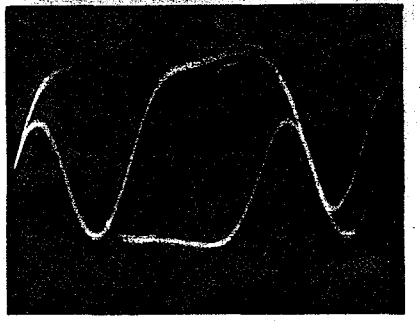
NG Fig. 19

NG Fig. 20



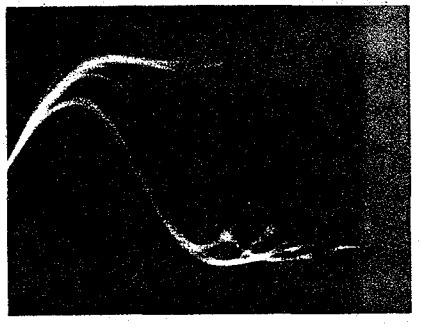
OK Fig. 21

OK Fig. 22



NG Fig. 23

Play tune TNO 7 (TYPE4)

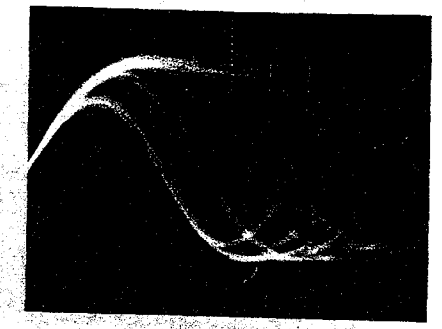


NG Fig. 24

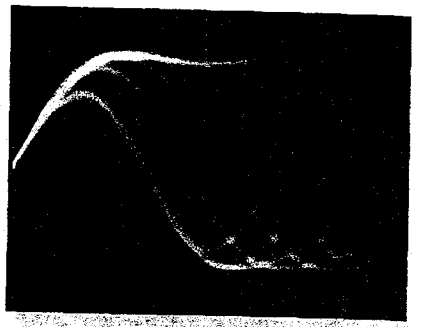
Play tune TNO 12 (TYPE4)

Adjustment Procedure (without R379 removed)

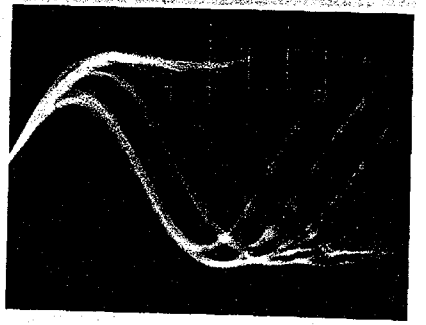
1. Play tune TNO 12 in normal mode. (TYPE 3: TNO 14)
2. Turn the tangential adjustment screw to obtain a good RF waveform eye pattern. Turn the adjustment screw both clockwise and counterclockwise to points where the eye pattern deteriorates, and take the midway point as the adjustment point. As a general guide, look for an overall clear waveform, and one of the diamond shapes in the eye pattern. The diamond shapes should appear in fine lines at the point of optimum adjustment. Take care not to knock the pick-up with the screwdriver at this stage. (This kind of accident can result in loss of focus.) (See Fig. 25-27)
3. Apply "screw-lock" to the tangential adjustment screw.
4. After adjusting tangential skew, also adjust the grating.



NG Fig. 25



OK Fig. 26



NG Fig. 27

6.8 Grating Adjustment

- Purpose: The grating may need adjustment in a replaced pick-up assembly.
- Maladjustment symptoms: No disc playback; track jumping

● Measuring equipment/ jigs	• Oscilloscope, clock driver, grating adjustment filter (bandpass filter), AC millivoltmeter, two low-pass filters
● Measuring point	• TEY, E LPF output, F LPF output
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Test mode
● Adjustment position	• Pick-up grating adjustment hole

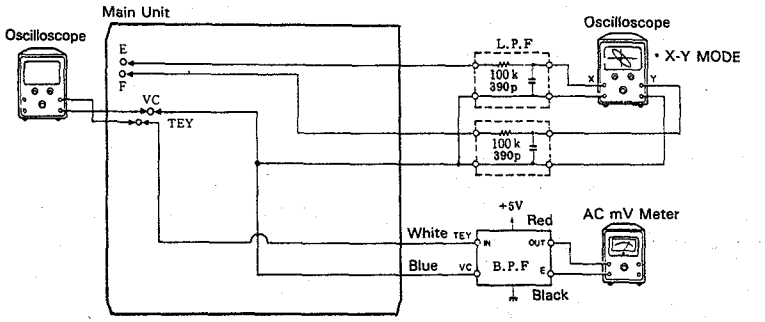


Fig. 28

Adjustment Procedure

1. Connect a low-pass filter (100k, 390p) to test points E, F, and VC as shown in the above diagram.
2. Switch regulator ON in test mode, and load a disc.
3. Press the RPT/RANDOM key to close focus.
4. Press the SCAN key to close tracking.
5. Press the FWD or REV key, move the pick-up to about the center of the signal surface (tune TNO 6). (TYPE 3: TNO 7)
6. Press the SCAN key to open tracking.
7. While monitoring the TEY filter output by AC milli- voltmeter, turn the grating adjustment hole slowly. The AC voltage increases and decreases while turning the screw. Search for the minimum voltage level. (This corresponds to the position where the grating is on a track, and is referred to as the null point.)
8. Then while monitoring TEY by oscilloscope, turn the driver slowly clockwise from the null point (as seen from under the lens) until the first waveform peak amplitude is reached. (See Fig. 30-35)

9. With the E low-pass filter output connected to the X axis of the oscilloscope, and the F low-pass filter output connected to the Y axis, apply an input in AC mode and observe the Lissajous figure.
10. Using the driver, adjust the Lissajous figure to a single line (or as close as possible).
11. Switch regulator OFF and remove the filters.

B.P.F.

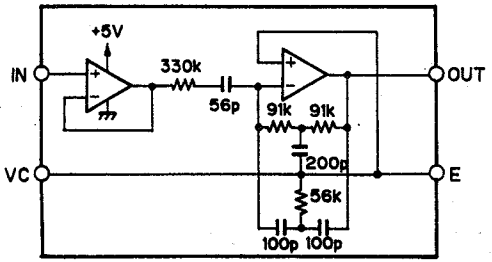


Fig. 29

TEY waveform 10ms/div, 500mV/div

Null Point

Lissajous figure (AC input)
Horizontal axis E 20mV/div
Vertical axis F 20mV/div

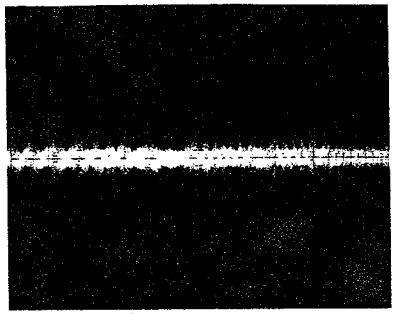


Fig. 30

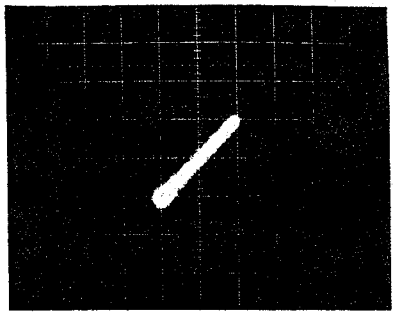


Fig. 31

"Rough" adjustment

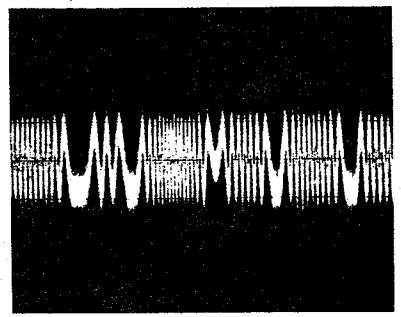


Fig. 32

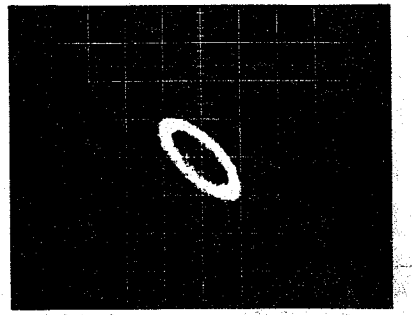


Fig. 33

Final adjustment

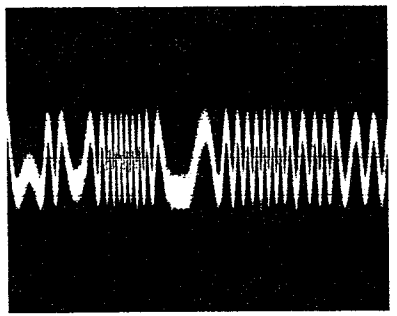


Fig. 34

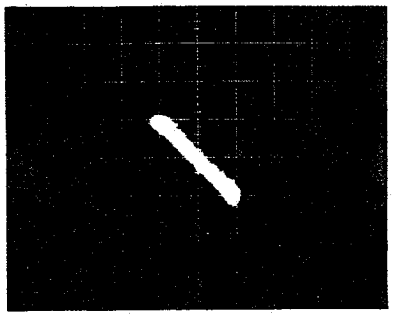


Fig. 35

6.9 Focus Bias Adjustment

● Purpose: To adjust the focus servo bias to an optimum value

● Maladjustment symptoms: Focus closing difficulty, poor playability

● Measuring equipment/ jigs	• Oscilloscope
● Measuring point	• RFO
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Normal mode
● Adjustment position	• VR352-1 (FEB)

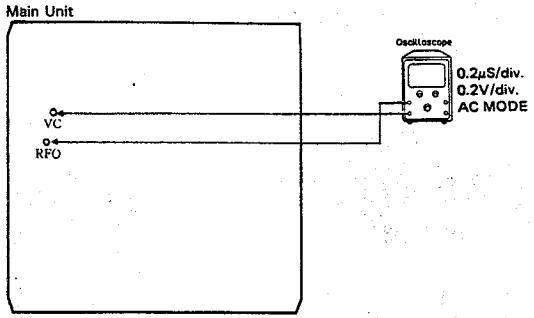
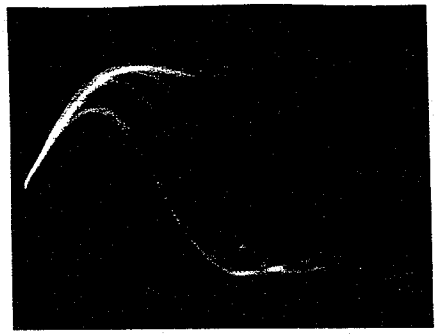


Fig. 36

Adjustment Procedure

1. Play tune TNO 12 in normal mode. (TYPE 3: TNO 14)
2. Observe RFO in respect to VC in the oscilloscope, and adjust VR352-1 (FEB) to obtain maximum RF and optimum eye pattern. (See Fig. 37 and 38)



OK Fig. 37

0.2μs/div.
0.2V/div.
AC Mode

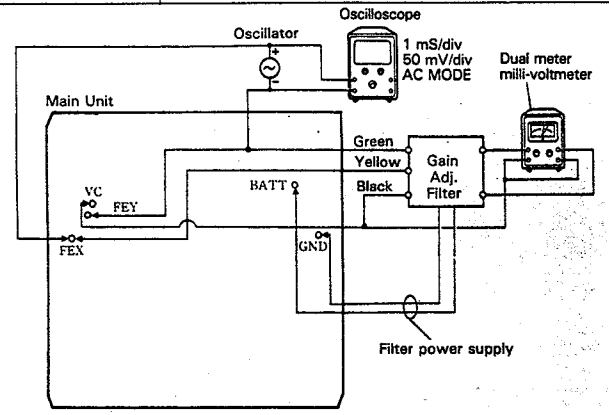
Before adjustment Fig. 38

6.10 Focus Servo Loop Gain Adjustment

● Purpose: To adjust the focus servo loop gain to an optimum value

● Maladjustment symptoms: Poor playability, reduced resistance to vibration, focus closure fails readily

● Measuring equipment/ jigs	• Oscillator, gain adjustment filter, dual meter milli-voltmeter (Same as for CDX-2)
● Measuring point	• FEX, FEY
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Normal mode
● Adjustment position	• VR351-3 (FG)



Note: Leave the negative side of the other oscilloscope channel open.

Connect the negative milli-voltmeter lead to VC, and do not connect VC to the power supply ground.

Fig. 39

Adjustment Procedure

1. After checking that the power is OFF, connect the gain adjustment filter and measuring equipment as shown in the above diagram.
2. Play tune TNO 12 in normal mode. (TYPE 3: TNO 14)
3. Set the oscillator to 1kHz, and observe the FEX/FEY output in the oscilloscope. Adjust the oscillator output to obtain a FEX/FEY output of 200mVp-p.
4. Adjust VR351-3 (FG) to obtain a milli-voltmeter difference of 0 ± 0.5dB.

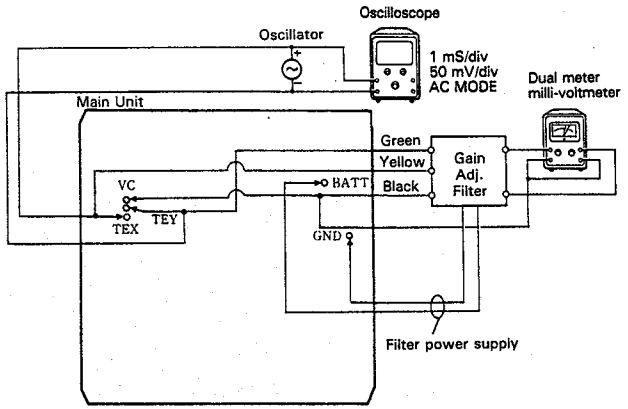
CDX-4

6.11 Tracking Servo Loop Gain Adjustment

● Purpose: To adjust the tracking servo loop gain to an optimum value

● Maladjustment symptoms: Poor playability, reduced resistance to vibration

● Measuring equipment/ jigs	• Oscillator, gain adjustment filter, dual meter milli-voltmeter
● Measuring point	• TEX, TEY
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Normal mode
● Adjustment position	• VR351-2 (TG)



Note: Leave the negative side of the other oscilloscope channel open.

Connect the negative milli-voltmeter lead to VC, and do not connect VC to the power supply ground.

Fig. 40

Adjustment Procedure

1. After checking that the power is OFF, connect the gain adjustment filter and measuring equipment as shown in the above diagram.
2. Play tune TNO 12 in normal mode. (TYPE 3: TNO 14)
3. Set the oscillator to 1.4kHz, and observe the TEX/TEY output in the oscilloscope. Adjust the oscillator output to obtain a TEX/TEY output of 200mVp-p.
4. Adjust VR351-2 (TG) to obtain a milli-voltmeter difference of 0 ± 0.5dB.

6.12 TE Offset Adjustment - II

● Purpose: To adjust the electrical offset of the tracking servo to zero.

● Maladjustment symptoms: Search times too long, carriage run-away

● Measuring equipment/ jigs	• DC voltmeter
● Measuring point	• TAO low-pass filter output
● Test disc and setting	• No disc • Test mode
● Adjustment position	• VR352-2

Adjustment Procedure

Same as for TE offset adjustment - I, but with the DC voltage of the TAO LPF output adjusted to 0 ± 50mV.
The purpose of this additional adjustment is to correct any deviations generated when carrying out the tracking balance and tracking servo loop gain adjustments after completing TE offset adjustment - I.

6.13 Tracking Balance Adjustment - II

● Purpose: To adjust the tracking servo offset to zero.

● Maladjustment symptoms: Search times too long, poor playability, carriage run-away

● Measuring equipment/ jigs	• Oscilloscope
● Measuring point	• TEY low-pass filter output
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Test mode
● Adjustment position	• VR351-1

Adjustment Procedure

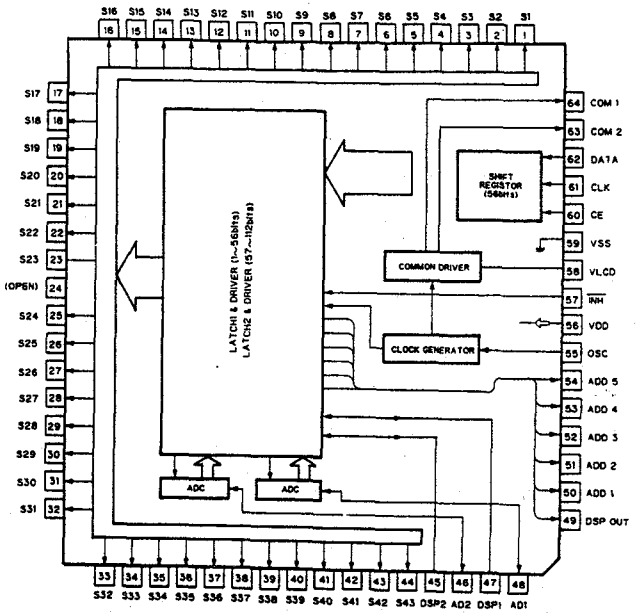
Steps 1 thru 5 same as tracking balance adjustment-I.

6. Check that the level difference between the positive and negative amplitudes of the TEY signal is within 5% (See Fig. 15-17). If greater than 5%, adjust with VR351-1.
7. If further adjustment was necessary in step 6, repeat TE offset adjustment - II.

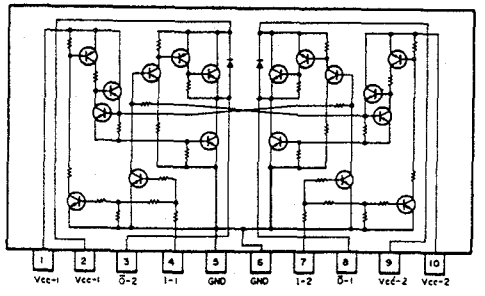
CDX-4

●IC

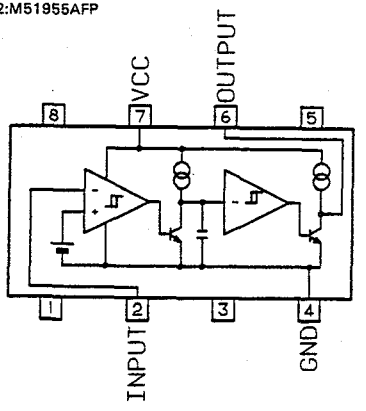
IC901:LC7582A



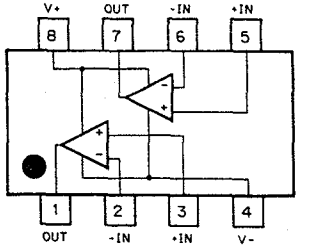
IC754:M54546AL



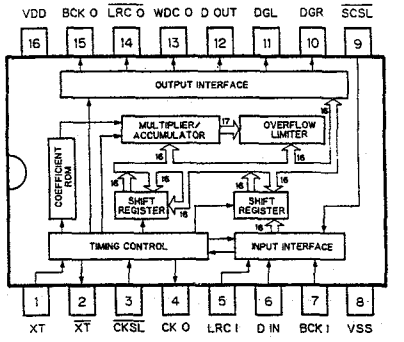
IC752:M51955AFP



IC655,657,661,662,706,707:M5218FP
IC705:μPC358G2



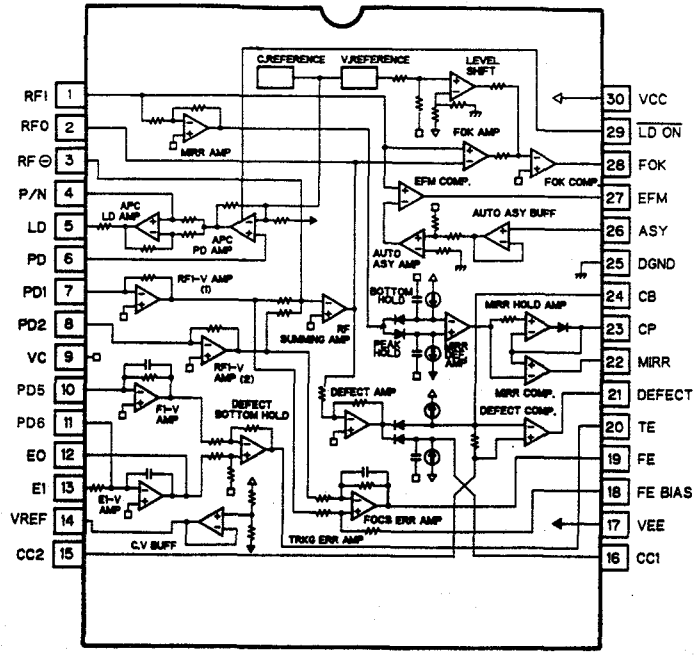
IC703:SM5807ES-M


VDD BCK O LRC O WDC O D OUT DGL DGR SCSL
16 15 14 13 12 11 10 9
OUTPUT INTERFACE
MULTIPLIER/ ACCUMULATOR
OVERFLOW LIMITER
COEFFICIENT ROM
SHIFT REGISTER
SHIFT REGISTER
TIMING CONTROL
INPUT INTERFACE
1 2 3 4 5 6 7 8
XT XT CKSL CK O LRC I D IN BCK I VSS

● Pin Functions (SM5807ES-M)

Pin	Pin name	I/O	Function and Operation
1	XT	input	Oscillator input
2	$\overline{XT}$	output	Oscillator output
3	CKSL		"H":XT←16.93MHz input
4	CKO	output	Clock output
5	LRCI		44.1kHz synchronization clock input
6	DIN		Serial data input
7	BCKI		Bit clock input(Serial input)
8	VSS		GND
9	SCSL		System clock switching. "H":192fs(fs:Sampling frequency)
10	DGR	output	R-ch digridge signal(176.4kHz)
11	DGL	output	L-ch digridge signal(176.4kHz)
12	DOUT	output	Serial data output
13	WDCO	output	Output control clock(352.8kHz)
14	$\overline{LRCO}$	output	Output control clock(176.4kHz)
15	BCKO	output	Bit clock output(Serial output)
16	VDD		Power supply(5V)

*IC351 : CXA1081M

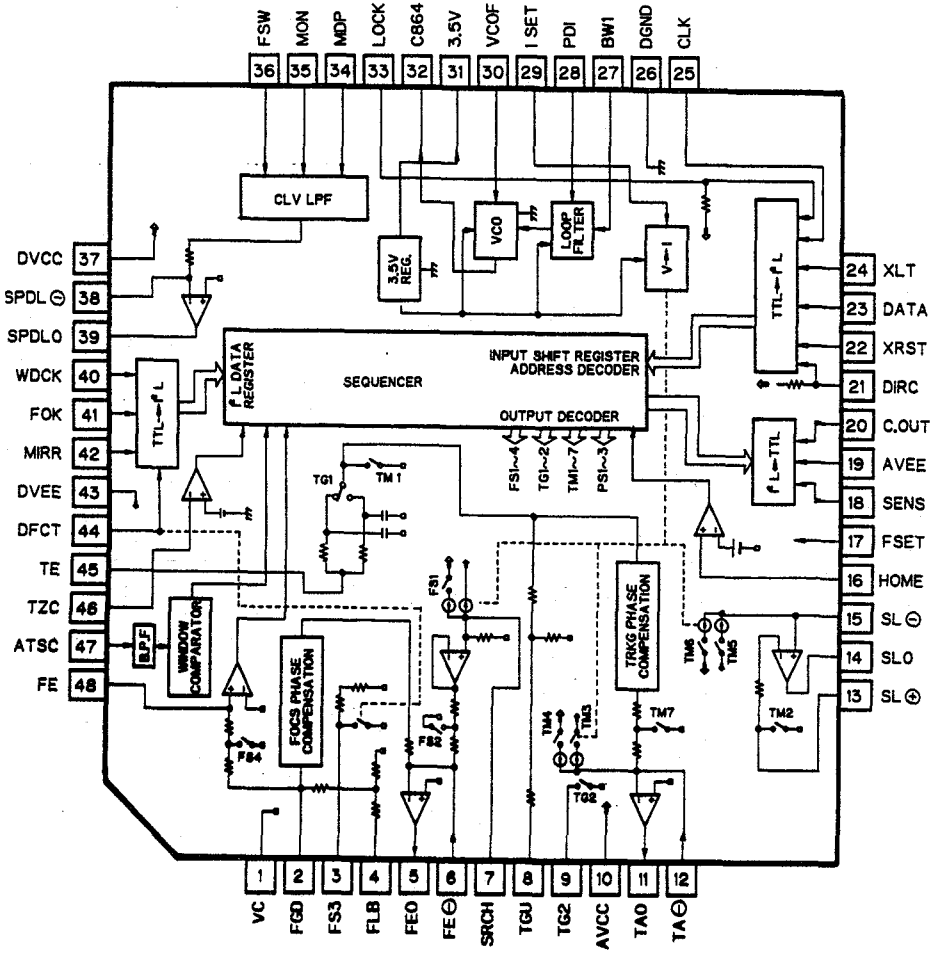


*IC's marked by * are MOS type.*
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

● Pin Functions (CXA1081M)

Pin No.	Pin Name	I/O	Function and Operation
1	RFI	Input	Input of capacitance-coupled RF summing amplifier output
2	RFO	Output	RF summing amplifier output pin - eye pattern check point
3	RF−	Input	RF summing amplifier feedback input pin
4	P/N	Input	Laser diode P-sub/N-sub selector pin
5	LD	Output	APC LD amplifier output pin
6	PD	Input	APC PD amplifier input pin
7	PD1	Input	RF I-V amplifier (1) inverter input pin - connected to photodiode A + C pin for current input
8	PD2	Input	RF I-V amplifier (2) inverter input pin - connected to photodiode B + D pin for current input
9	VC		Connected to VR
10	F	Input	I-V amplifier inverter input pin - connected to photodiode for current input
11	E	Input	I-V amplifier inverter input pin - connected to photodiode for current input
12	EO	Output	E I-V amplifier output pin
13	EI	Input	E I-V amplifier feedback input pin for E I-V amplifier gain adjustment
14	VR	Output	$(V_{CC} + V_{EE})/2$ DC voltage output pin
15	CC2	Input	Input of capacitance-coupled DEFECT bottom hold output
16	CC1	Output	DEFECT bottom hold output pin
17	VEE		Ground connection
18	FE BIAS	Input	Focus error amplifier non-inverting bias pin Used in focus error amplifier CMR adjustment
19	FE	Output	Focus error amplifier output pin
20	TE	Output	Tracking error amplifier output pin
21	DEFECT	Output	DEFECT comparator output pin
22	MIRR	Output	MIRR comparator output pin
23	CP	Input	MIRR hold capacitor connector pin - MIRR comparator non-inverting input pin
24	CB	Input	DEFECT bottom hold capacitor connector pin
25	DGND		Ground connection
26	ASY	Input	Auto asymmetry control input pin
27	EFM	Output	EFM comparator output pin
28	FOK	Output	Focus OK comparator output pin
29	$\overline{\text{LDON}}$	Input	Laser diode ON/OFF switching
30	VCC		Positive power supply pin

*IC601:CXA1082BQ

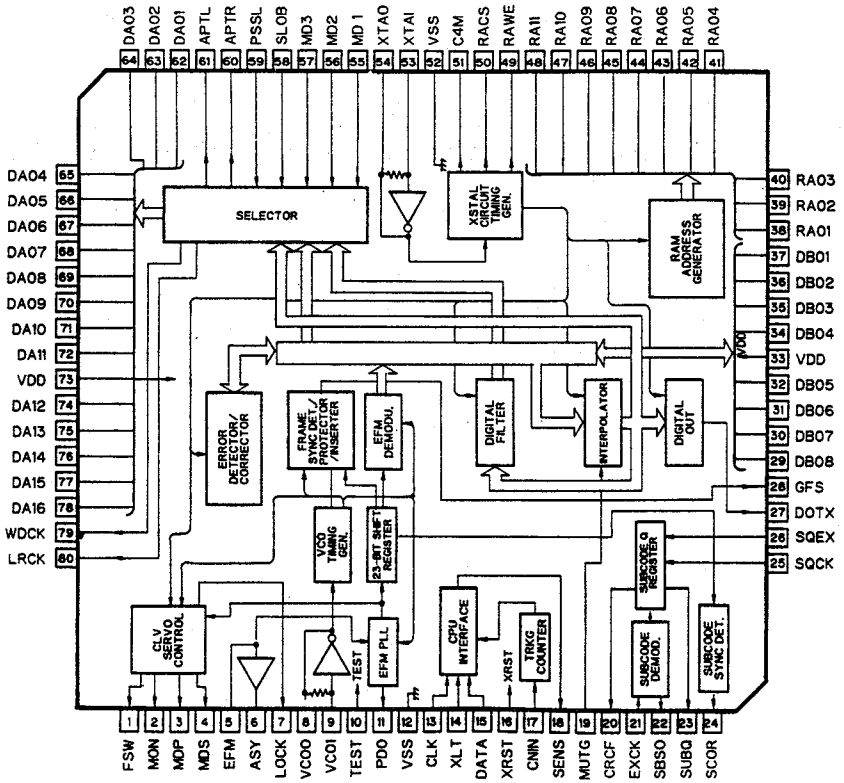


● Pin Functions (CXA1082BQ)

Pin No.	Pin Name	I/O	Function and Operation
1	VC		Servo reference voltage input pin
2	FGD		Connect to pin 3 to switch focus servo OFF when defect occurs
3	FS3		Internal DFCT switch closed when pin 44 is high
4	FLB		Focus servo low region boost external time constant pin
5	FEO	Output	Focus drive output - connect to low-end equalizer
6	FE−	Input	Focus amplifier inverter input pin
7	SRCH		Focus search waveform generation external time constant connector pin
8	TGU	Output	Tracking low-end equalizer connection output pin
9	TG2		Pin 7 discharge switch for starting focus search from lens center
10	AVCC		+5V connection
11	TAO	Output	Tracking drive output
12	TA−	Input	Tracking amplifier inverter input pin
13	SL+	Input	Sled amplifier non-inverting input pin
14	SLO	Output	Sled drive output
15	SL−	Input	Sled amplifier inverter input pin
16	HOME	Input	Sled home position detector switch input pin
17	FSET		Focus/tracking phase compensation peak and CLV low-pass filter f_0 setting pin
18	SENS	Output	Output of FZC, AS, TZC, SSTOP, and $\overline{\text{BUSY}}$ depending on command from CPU
19	AVEE		AGND connection
20	COUT	Output	Track counter signal output
21	DIRC		Not used
22	XRST	Input	Reset input pin - reset when "L"
23	DATA	Input	Serial data input from CPU
24	XLT	Input	Latch input from CPU
25	CLK	Input	Serial data transfer clock input from CPU
26	DGND		DGND connection
27	BW1		Loop filter external time constant pin
28	PDI	Input	Input of CXD1135 phase comparator output PDO
29	ISET		Current which determines focus search, track jump, and sled kick height
30	VCOF		VCO free-running frequency more or less inversely
31	3.5V	Output	Proportional to resistance value between pins 30 and 31
32	C864	Output	8.64MHz VCO output pin
33	LOCK		Not used
34	MDP		Connect to MDP pin of CXD1135
35	MON		Connect to MON pin of CXD1135
36	FSW		CLV servo error signal low-pass filter external time constant pin
37	DVCC		+5V connection
38	SPDL−	Input	Spindle drive amplifier inverter input pin

Pin No.	Pin Name	I/O	Function and Operation
39	SPDLO	Output	Spindle drive output
40	WDCK	Input	Auto-sequence clock input 176.4kHz
41	FOK	Input	FOK signal input pin
42	MIRR	Input	Mirror signal input pin
43	DVEE		DGND connection
44	DFCT	Input	DEFECT signal input pin - defect countermeasure circuit activated when this input is high
45	TE	Input	Tracking error signal input pin
46	TZC	Input	Tracking zero-cross comparator input pin
47	ATSC	Input	Tracking lens offset detector window comparator input pin
48	FE	Input	Focus error signal input pin

*IC701: CXD1135Q



● Pin Functions (CXD1135Q)

Pin No.	Pin Name	I/O	Function and Operation
1	FSW	Output	Spindle motor output filter time constant selector output
2	MON	Output	Spindle motor ON/OFF control output
3	MDP	Output	Spindle motor drive output - "rough" control in CLV-S mode, and phase control in CLV-P mode
4	MDS	Output	Spindle motor drive output - speed control in CLV-P mode
5	EFM	Input	EFM signal input from RF amplifier
6	ASY	Output	EFM signal slice level control output
7	LOCK	Output	Sampling of GFS signal by WFCK/16 - "H" output if "H", "L" output if "L" detected eight times in succession
8	VCOO	Output	VCO output - f = 8.6436MHz when EFM signal is locked
9	VCOI	Input	VCO input
10	TEST	Input	(0V)
11	PDO	Ouptut	EFM signal and VCO/2 phase comparison output
12	V_{SS}	–	Ground (0V)
13	CLK	Input	Serial data transfer clock input from CPU - data latched by clock leading edge
14	XLT	Input	Latch input from CPU - 8-bit shift register data (serial data from CPU) is latched in each register.
15	DATA	Input	Serial data input from CPU
16	XRST	Input	System reset signal input - reset when "L"
17	CNIN	Input	Tracking pulse input
18	SENS	Output	Output of internal status according to address
19	MUTG	Input	Muting input - when ATTM of internal register A is "L", MUTG "L" denotes normal status, and "H" muted status
20	CRCF	Output	Sub-code Q CRC check result output
21	EXCK	Input	Clock input for sub-code serial output
22	SBSO	Output	Sub-code serial output
23	SUBQ	Output	Sub-code Q output
24	SCOR	Output	Sub-code synchronizing S0+S1 output
25	SQCK	Input/Output	Sub-code Q read clock
26	SQEX	Input	SQCK selector input
27	DOTX	Output	Digital out output ($\overline{WFCK}$ output)
28	GFS	Output	Frame synchronizing lock status indicator output
29	DB08	Input/Output	External RAM data pin - DATA8 (MSB)
30	DB07	Input/Output	External RAM data pin - DATA7
31	DB06	Input/Output	External RAM data pin - DATA6
32	DB05	Input/Output	External RAM data pin - DATA5
33	V_{DD}	–	Power supply (+5V)
34	DB04	Input/Output	External RAM data pin - DATA4
35	DB03	Input/Output	External RAM data pin - DATA3

Pin No.	Pin Name	I/O	Function and Operation
36	DB02	Input/Output	External RAM data pin - DATA2
37	DB01	Input/Output	External RAM data pin - DATA1 (LSB)
38	RA01	Output	External RAM address output - ADDR01 (LSB)
39	RA02	Output	External RAM address output - ADDR02
40	RA03	Output	External RAM address output - ADDR03
41	RA04	Output	External RAM address output - ADDR04
42	RA05	Output	External RAM address output - ADDR05
43	RA06	Output	External RAM address output - ADDR06
44	RA07	Output	External RAM address output - ADDR07
45	RA08	Output	External RAM address output - ADDR08
46	RA09	Output	External RAM address output - ADDR09
47	RA10	Output	External RAM address output - ADDR010
48	RA11	Output	External RAM address output - ADDR011 (MSB)
49	RAWE	Output	External RAM write enable signal output (active "L")
50	RACS	Output	External RAM chip select signal output (active "L")
51	C4M	Output	X'tal frequency division output (f = 4.2336MHz)
52	V_{SS}	–	Ground (0V)
53	XTAI	Input	Crystal oscillator input (f = 8.4672MHz)
54	XTAO	Output	Crystal oscillator output (f = 8.4672MHz)
55	MD1	Input	Mode selector input 1
56	MD2	Input	Mode selector input 2
57	MD3	Input	Mode selector input 3
58	SLOB	Input	Audio data output code selector input - 2's complement output if "L", offset binary output if "H"
59	PSSL	Input	Audio data output mode selector input - serial output if "L", parallel output if "H"
60	APTR	Output	Aperture correction control output - "H" when right channel
61	APTL	Output	Aperture correction control output - "L" when left channel
62	DA01	Output	C1F1 output
63	DA02	Output	C1F2 output
64	DA03	Output	C2F1 output
65	DA04	Output	C2F2 output
66	DA05	Output	C2FL output
67	DA06	Output	C2PO output
68	DA07	Output	RFCK output
69	DA08	Output	WFCK output
70	DA09	Output	$\overline{\text{PLCK}}$ output
71	DA10	Output	UGFS output
72	DA11	Output	GTOP output

Pin No.	Pin Name	I/O	Function and Operation
73	V_{DD}	–	Power supply (+5V)
74	DA12	Output	RAOV output
75	DA13	Output	C4LR output
76	DA14	Output	$\overline{\text{C21O}}$ output
77	DA15	Output	C21O output
78	DA16	Output	DATA output
79	WDCK	Output	Strobe signal output (88.2kHz)
80	LRCK	Output	Strobe signal output (44.1kHz)

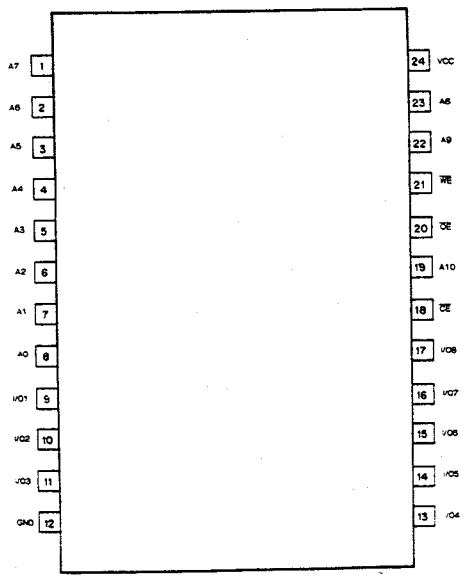
Note:

C1F1:
C1F2: C1 decoding error correction status monitor output

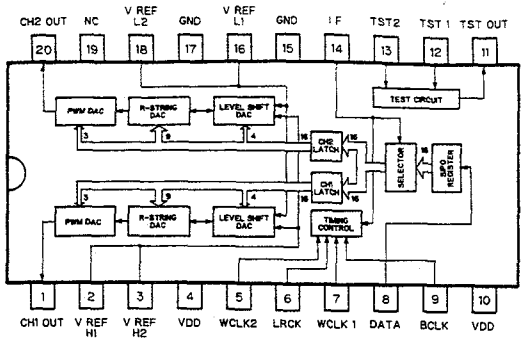
C2F1:
C2F2: C2 decoding error correction status monitor output

C2FL: Corrected status output - "H" if C2 system currently being corrected cannot be corrected
C2PO: C2 pointer indication output - synchronized with audio data output
RFCK: Read frame clock output - crystal oscillator 7.35kHz
WFCK: Write frame clock output - f = 7.35kHz when crystal oscillator is locked
$\overline{\text{PLCK}}$: VCO/2 output - f = 4.3218MHz when EFM signal is locked
UGFS: Unprotected frame synchronizing pattern output
GTOP: Frame synchronization protection status indicator output
RAOV: ±4 frame jitter absorption RAM overflow and underflow indicator output
C4LR: Strobe signal
$\overline{\text{C21O}}$: C21O inverting output
C21O: Bit clock output
DATA: Audio signal serial data output

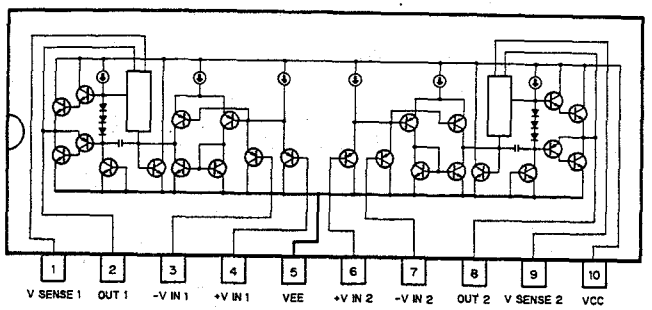
*IC702 : CXK5816M-15L



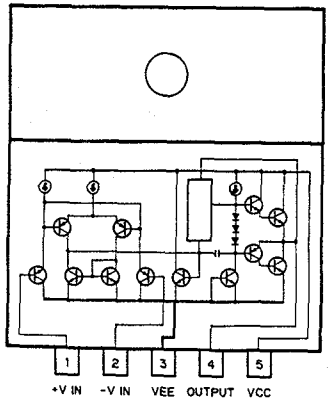
IC704 : LC7881MBM



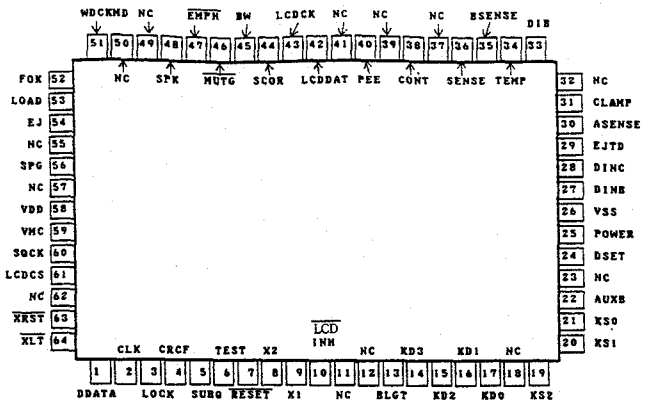
IC663,664 : LA6515



IC666~669 : LA6501-FA



*IC751 : PD4217B



• Pin Functions (PD4217B)

Pin	Pin name	I/O	Output Format	Function	Stanby	Reset
1	DDATA	output	C	Serial data output.	L	Hi
2	CLK	output	C	Serial data clock output.	L	Hi
3	LOCK	input		Spindle lock monitor.		Hi
4	CRCF	input		CRC check result input.		Hi
5	SUBQ	input		Sub-code data input.		Hi
6	TEST	input		Test program input	Hi	Hi
7	RESET			Reset		
8	X2	output		Oscillator output		
9	X1	input		Oscillator input		
10	LCDINH	output	C	LCD display inhibit output.	L	Hi
11	NC		C	GND		
12	NC		C	GND		
13	BLGT	output	C	Back light control output	L	Hi
14 ~ 17	KD3 ~ KD0	input		Key return input	Hi	Hi
18	NC			Open		
19 ~ 21	KS2 ~ KS0	output	C	Key strobe output	Hi	Hi
22	AUXB	output	C	AUX output	L	Hi
23	NC			Open		
24	DSET	output	NM	Disc set LED output	L	Hi
25	POWER	output	C	Regulator control output	L	Hi
26	VSS					
27	DINB	input		Disc sensor B input	Hi	Hi
28	DINC	input		Disc sensor C input	Hi	Hi
29	EJTD	input		Disc eject sensor (12cm)	Hi	Hi
30	ASENSE	input		ACC sense input	Hi	Hi
31	CLAMP	input		Disc clamped input	Hi	Hi
32	NC			GND		
33	DIB	input		AUX control input		
34	TEMP	input		High temperature detector input		

Pin	Pin name	I/O	Output Format	Function	Stanby	Reset
35	BSENSE	input		Back-up sense input	Hi	Hi
36	SENSE	input		CD LSI internal status monitor input.		
37	NC			Open		
38	CONT	output	C	Linear driver ON/OFF control output	L	Hi
39	NC			Open		
40	PEE	output	C	PEE output.	L	Hi
41	NC					
42	LCDDAT	output		LCD data output	H	Hi
43	LCDCK	output		LCD clock	H	Hi
44	SCOR	input		Sub-code synchronization input.	Hi	Hi
45	BW	output	NM	Spindle motor output filter time constant selection output.	L	Hi
46	$\overline{\text{MUTG}}$	output	NM	Mute output.	L	Hi
47	$\overline{\text{EMPH}}$	output	NM	Emphasis selector output.	H	Hi
48	SPK	output	NM	Spindle kick gain switching.	L	Hi
49	NC			GND		
50	NC					
51	WDCKMD	input		WDCK switching output.	H	Hi
52	FOK	input		Indication that focus is closed and RF input is active.	Hi	Hi
53	LOAD	output	NM	Loading motor driver control output.	L	Hi
54	EJ	output	NM	Loading motor driver control output.	L	Hi
55	NC			Open		
56	SPG	output	NM	Spindle gain switching.	L	Hi
57	NC			VDD		
58	VDD			VDD		
59	VMC	output	C	Loading motor driver power supply.	L	Hi
60	SQCK	output	C	Sub-code clock.	L	Hi
61	LCDCS	output	C	LCD chip enable.	L	Hi
62	NC			Pull down		
63	$\overline{\text{XRST}}$	output	C	CD LSI reset output.	L	Hi
64	$\overline{\text{XLT}}$	output	C	Serial data latch output.	L	Hi

Output Format	Meaning
C	C-MOS
NM	Neutral resistivity N channel open drain
Hi	Hi-impedance

Circuit Diagram Symbols

Symbol	Function
A	1/4 division detector output used in detection of RF and focus signal
ACC	14.4V
AGND	Analog ground
ASY	Asymmetry
ATSC	Anti-shock (carriage motor control during playback)
B	1/4 division detector output used in detection of RF and focus signal
BATT	14.4V(constant power supply)
BDATA	Bus data signal
BRST	Bus reset signal
BRXEN	Bus line busy signal
BSCK	Bus synchronizing shift clock
BSRQ	Bus service request line
BYPASS	Bypass (non-drive enabled by connecting to ground)
C	1/4 division detector output used in detection of RF and focus signal
CM+, −	Carriage motor drive signal
D	1/4 division detector output used in detection of RF and focus signal
DFCT	Defect signal
DGND	Digital ground
DINB	Disc presence detector signal (8cm/12cm)
DINC	Disc presence detector signal
E	Tracking signal start detector
EFM	8-14 modulation
EJ	Eject signal
EMPH	Emphasis switching signal
F	Tracking signal end detector
FA+, −	Focus actuator drive signal
FEO	Focus signal output(IC601 pin no.5)
FEO2	Focus 2 (IC655 pin no.1)
HOME	Home position detector signal(pick-up at home position when "L")
LD	Laser diode
LOAD	Disc loading power supply ON/OFF signal
MON	Motor ON
MD	Monitor diode
MUTG	Mute signal
POWER	Power supply control signal
REG5	+5V
REM0	AUX remote control
REM1	
SLO	Carriage output signal (IC601 pin no.14)
SM+, −	Spindle motor drive signal
SPDLO	Spindle motor error signal(IC601 pin no.39)
SPTAO	Tracking side path signal output
TA+, −	Tracking actuator drive signal
TAIN	Tracking actuator drive input signal
TGU	Tracking side path input
TZC	T.E zero-cross signal
VC	Signal reference signal(2.5V)
VREF	Signal reference voltage buffer output(2.5V)

7. CONNECTION DIAGRAM

CARRIAGE P.C. BOARD

CARRIAGE M832

SPINDLE M831

S831 HOME

PU UNIT

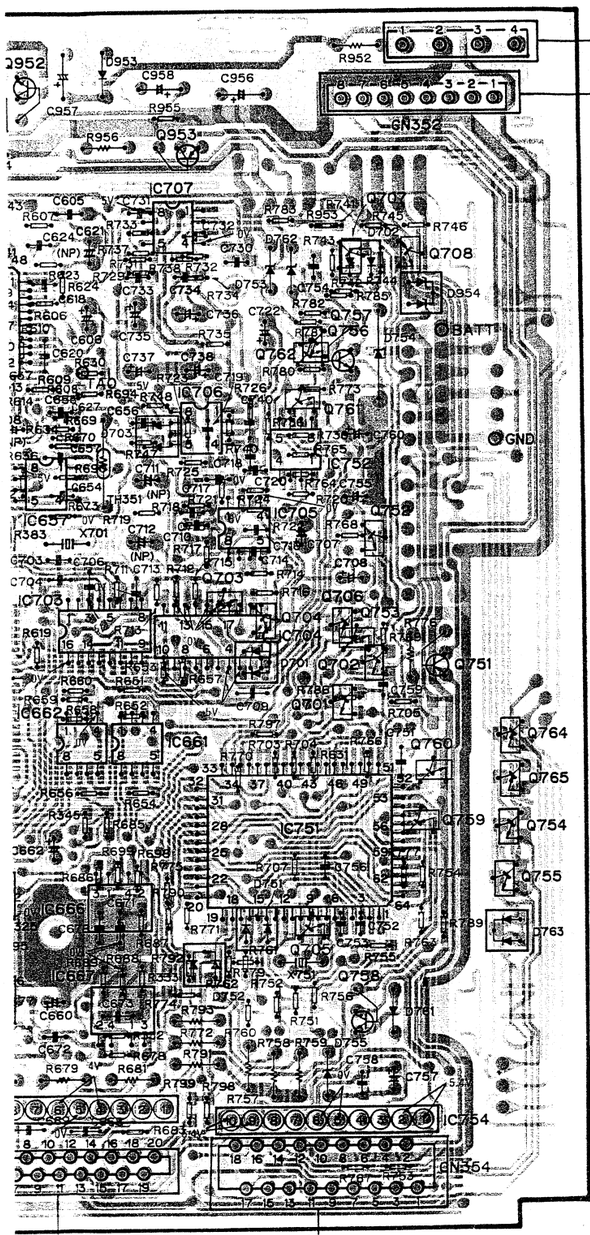
MAIN UNIT

MECHANISM P.C. BOARD

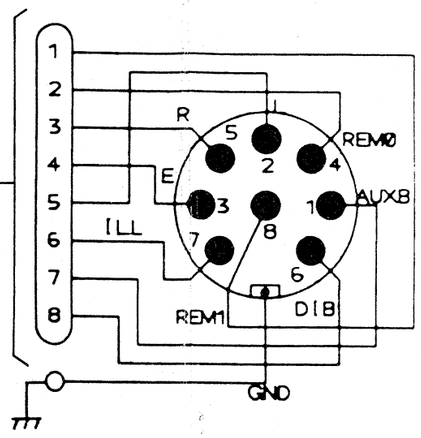
S832 DISC SET

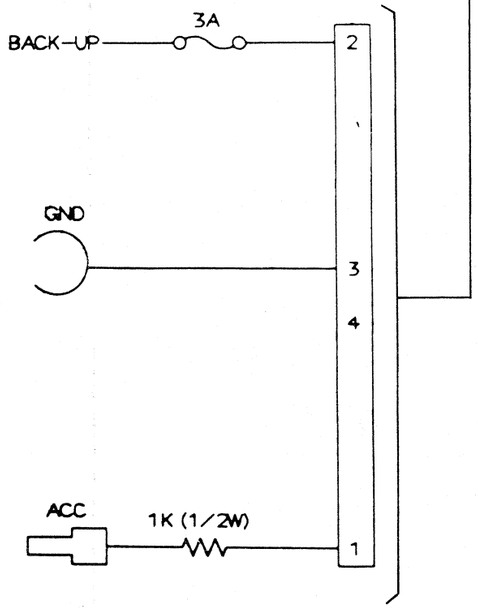
M833 LOADING

DETECTOR P.C. BOARD



ADJ	IC. Q
	IC951 Q952
	Q951 Q953
	Q602 Q603 IC707
	Q351 Q707 Q708
VR604	IC601 Q352
	Q756 Q762 Q757
	IC351 Q761
	IC706 IC752
VR352	Q601 IC655 IC657
	IC705 Q752
VR651	Q703
	IC703 IC704 Q706 Q753
VR351	Q702 Q751
	IC702 IC701 Q701
	IC662 IC661 Q764
	Q760 Q765
	IC751 Q759 Q754
	IC668 IC666 Q755
	Q705
	Q653
	Q652 IC669 IC667
	Q758
	Q651
	IC663 IC664 IC754





DISPLAY UNIT

IC. Q				
Q903 Q902	Q901	IC901		Q904

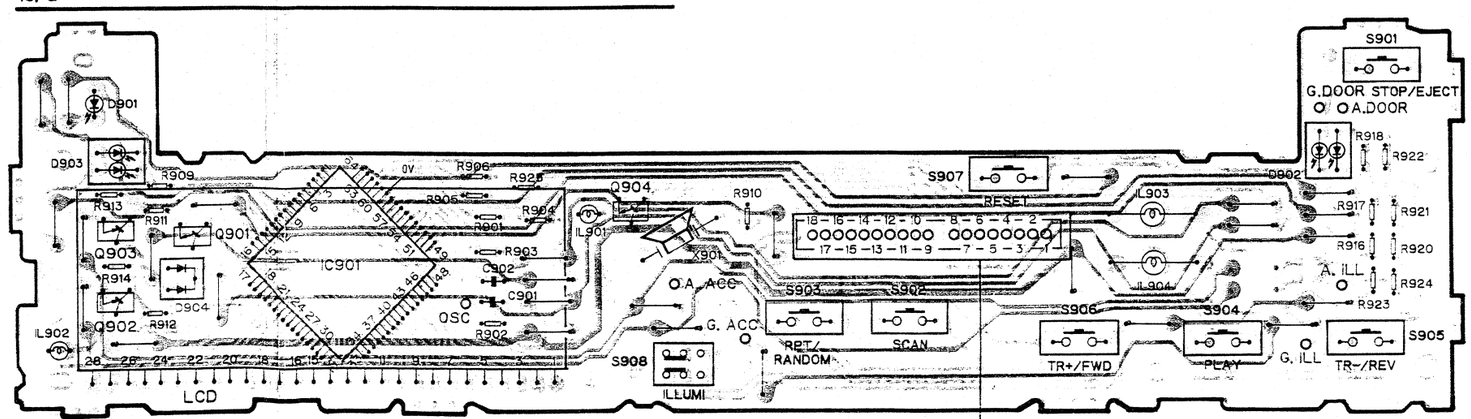
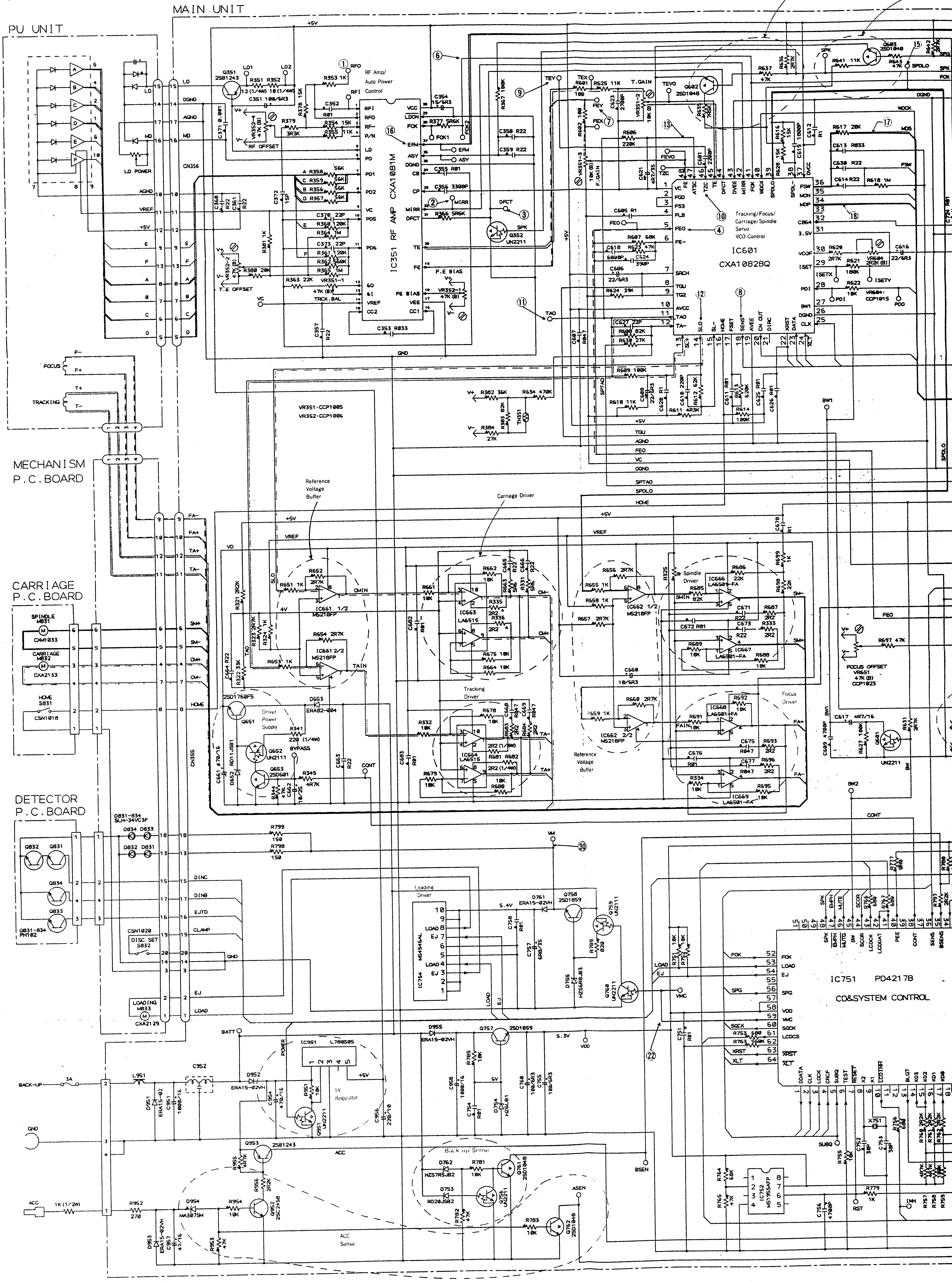


Fig. 41

8. SCHEMATIC CIRCUIT DIAGRAM



MAIN UNIT
PU UNIT
LD POWER
FOCUS
TRACKING
MECHANISM P.C.BOARD
CARRIAGE P.C.BOARD
SPINDLE M831
CXM1033
CARRIAGE M832
CXA2133
HOME S831
CSN1018
DETECTOR P.C.BOARD
Q831-834 PH102
D831-834 SLH-34VC3F
CSN1020
DISC SET S832
LOADING M833
CXA2129
CN356
CN355
IC351 RF AMP CXA1081M
RF Amp/ Auto Power Control
RF OFFSET
T.E OFFSET
TRCK.BAL
F.E BIAS
VR351 : CCP1005
VR352 : CCP1006
Q351 2SB1243
Q352 UN2211
Spindle Kick Voltage Control
Spindle Gain Control
Q602 2SD1048
Q603 2SD1048
T.GAIN
F.GAIN
IC601 CXA1082BQ
Tracking/Focus/ Carriage/Spindle Servo VCO Control
Reference Voltage Buffer
IC661 1/2 M5218FP
IC661 2/2 M5218FP
Carriage Driver
IC663 LA6515
Tracking Driver
IC664 LA6515
IC662 1/2 M5218FP
IC662 2/2 M5218FP
Spindle Driver
IC666 LA6501-FA
IC667 LA6501-FA
Focus Driver
IC668 LA6501-FA
IC669 LA6501-FA
FOCUS OFFSET VR651 47K (B) CCP1023
Q601 UN2211
Driver Power Supply
2SD1760F5 Q651
Q652 UN2111
Q653 2SD601
Loading Driver
IC754 M54546AL
Q758 2SD1859
Q759 UN2111
Q760 UN2211
IC751 PD4217B
CD&SYSTEM CONTROL
IC752 M51955AFP
X751
IC951 L780S05
5V Regulator
Q951 UN2211
Q953 2SB1243
Q952 2SC2458
ACC Sense
Back up Sense
Q757 2SD1859
Q761 2SD1048
Q756 UN2211
Q762 2SD1048
BACK-UP
GND
ACC
BATT
BSEN
ASEN
SUBQ
RST
INH

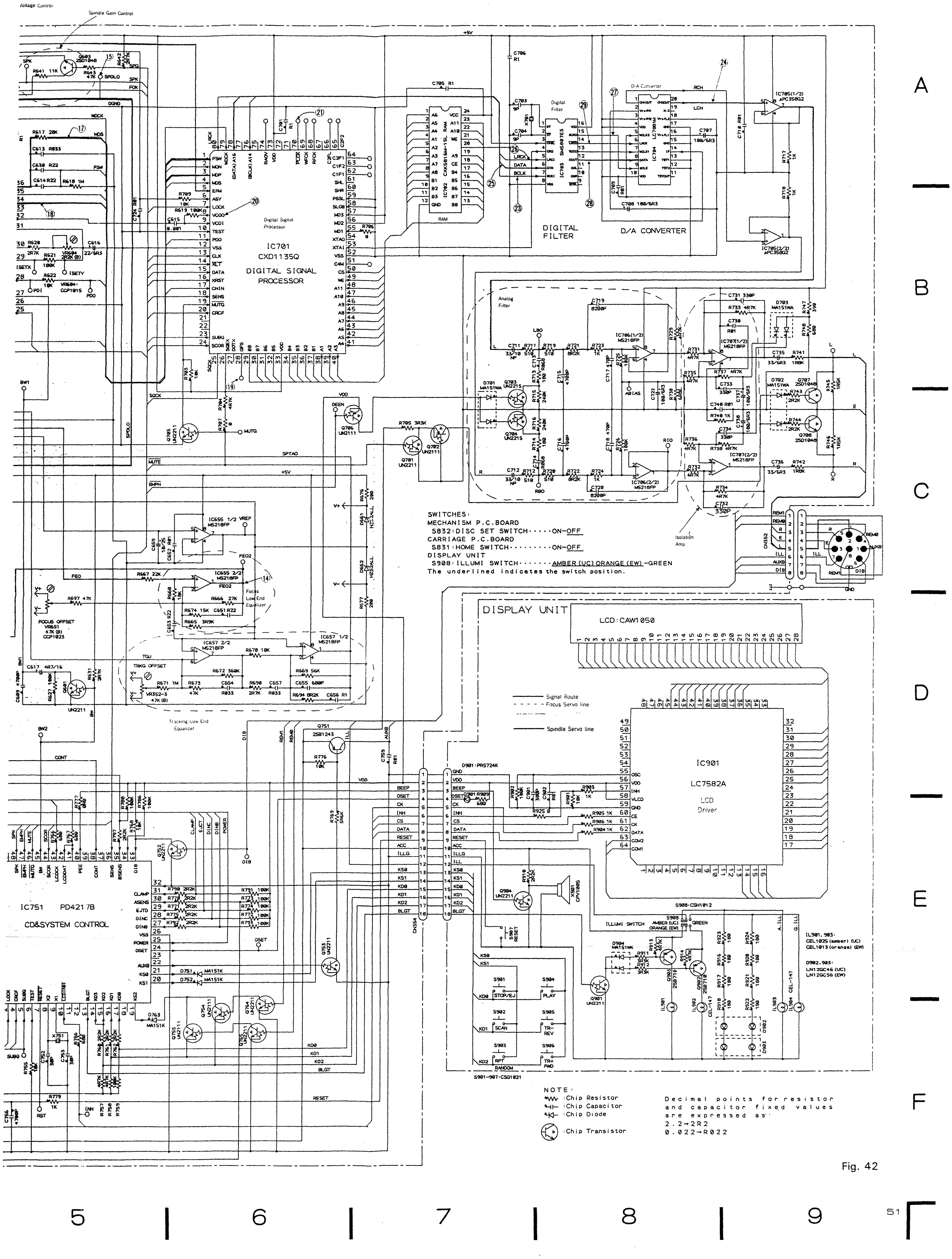
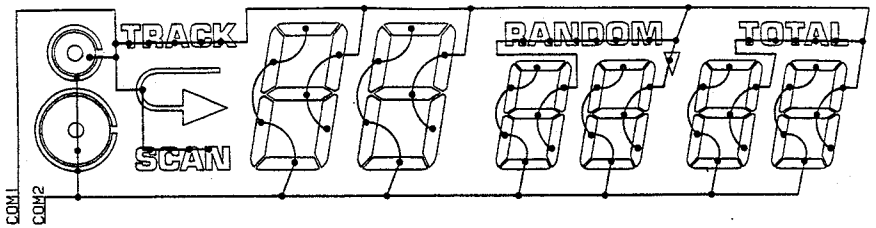

Voltage Control
Spindle Gain Control
+5V
DGND
IC701
CXD1135Q
DIGITAL SIGNAL PROCESSOR
Digital Signal Processor
IC702 CXK5816M-15L RAM
RAM
IC703 SM5807ES
Digital Filter
IC704 LC7881M
D-A Converter
DIGITAL FILTER
D/A CONVERTER
RCH
LCH
DATA
BCLK
LRCK
IC705(1/2) μPC358G2
IC705(2/2) μPC358G2
Analog Filter
IC706(1/2) M5218FP
IC706(2/2) M5218FP
IC707(1/2) M5218FP
IC707(2/2) M5218FP
Isolation Amp
SWITCHES:
MECHANISM P.C.BOARD
S832:DISC SET SWITCH·····ON-OFF
CARRIAGE P.C.BOARD
S831:HOME SWITCH·····ON-OFF
DISPLAY UNIT
S908:ILLUMI SWITCH·····AMBER (UC) ORANGE (EW) -GREEN
The underlined indicates the switch position.
DISPLAY UNIT
LCD:CAW1050
IC901
LC7582A
LCD Driver
D901:PR5724K
S901-907:CSG1021
S908:CSH1012
ILLUMI SWITCH
AMBER (UC)
ORANGE (EW)
GREEN
IL901,903:
CEL1025(amber) (UC)
CEL1013(orange) (EW)
D902,903:
LN12GC46 (UC)
LN12GC56 (EW)
IC751 PD4217B
CD&SYSTEM CONTROL
Tracking Low End Equalizer
Focus Low End Equalizer
FOCUS OFFSET
VR651
47K (B)
CCP1023
TRKG OFFSET
VR352-3
47K (B)
IC655 1/2 M5218FP
IC655 2/2 M5218FP
IC657 1/2 M5218FP
IC657 2/2 M5218FP
Signal Route
Focus Servo line
Spindle Servo line
NOTE:
:Chip Resistor
:Chip Capacitor
:Chip Diode
:Chip Transistor
Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022

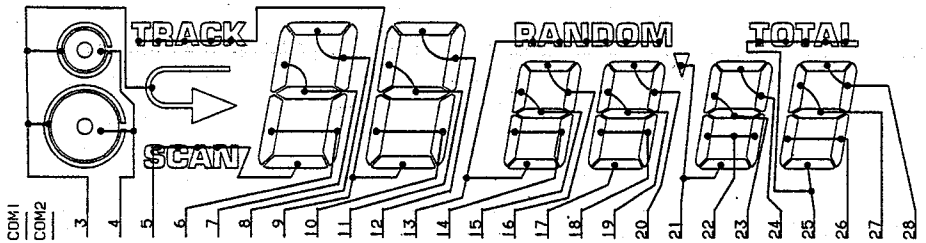
Fig. 42

● LCD(CAW1050)

COMMON



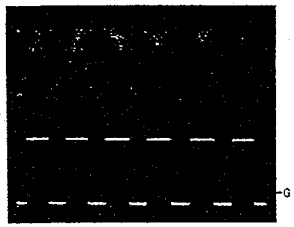
SEGMENT



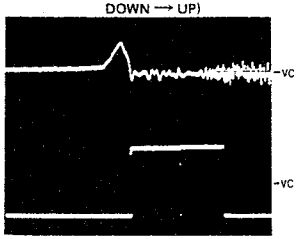
Note: 1. The encircled numbers denote measuring points in the circuit diagram.
2. Reference voltage
G: GND VC: Pin 9 of CXA1081M (2.5V)

• Wave Forms

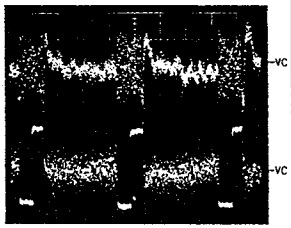
① CH1: RFO 0.4V/div. 0.4ms/div.
② CH2: MIRR 2V/div.
Test mode: Tracking open



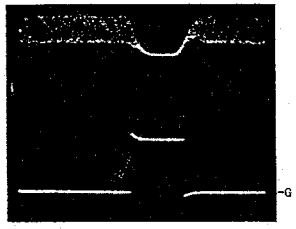
⑦ CH1: FEY 1V/div. 4ms/div.
⑧ CH2: SENS 2V/div.
Normal mode: Focus close (The lens moves DOWN ⟶ UP)



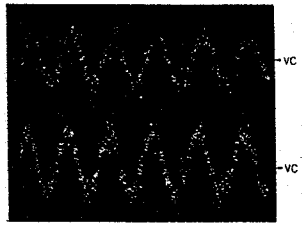
⑨ CH1: TEY 0.4V/div. 4ms/div.
⑪ CH2: TAO 0.4V/div.
Normal mode: Track search (80 track jump)



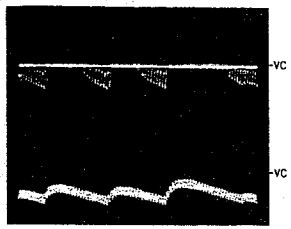
① CH1: RFO 1V/div. 0.4ms/div.
③ CH2: DFCT 2V/div.
Normal mode: The defect part passes 800μm.



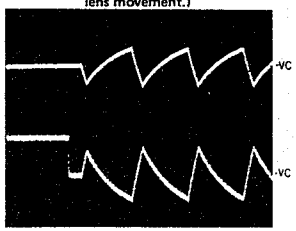
③ CH1: TEY 0.4V/div. 0.4ms/div.
⑩ CH2: TZC 0.4V/div.
Test mode: Tracking open



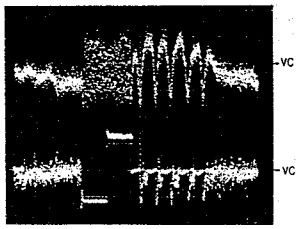
⑫ CH1: SLO 0.4V/div. 2S/div.
⑬ CH2: ATSC 0.02V/div.
Normal mode: PLAY



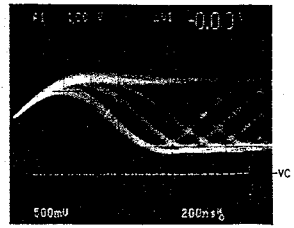
④ CH1: FEO 0.2V/div. 0.4S/div.
⑤ CH2: Pin 7 of CXA1082BQ 0.1V/div.
Test mode: Connect the FOK2 to GND. Focus search is performed. (CH1 is the same phase as the lens movement.)



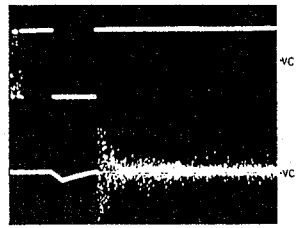
⑨ CH1: TEY 0.4V/div. 2ms/div.
⑪ CH2: TAO 0.4V/div.
Normal mode: Brake wave form when track search is performed.



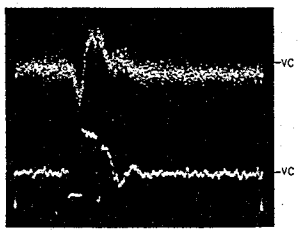
① RFO 0.5V/div. 200ns/div.
Normal mode: PLAY



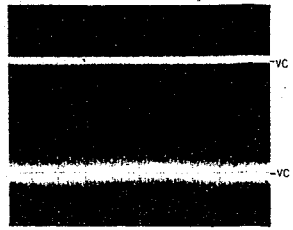
⑥ CH1: FOK2 2V/div. 0.2S/div.
④ CH2: FEO 0.4V/div.
Normal mode: Focus close



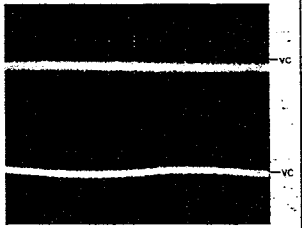
⑨ CH1: TEY 0.4V/div. 0.4ms/div.
⑪ CH2: TAO 0.4V/div.
Test mode: Single jump



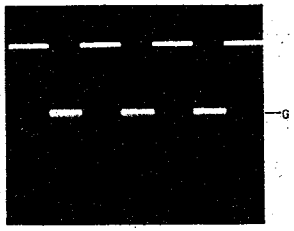
⑦ CH1: FEY 0.5V/div. 20ms/div.
⑭ CH2: FEO2 0.5V/div.
Normal mode: PLAY



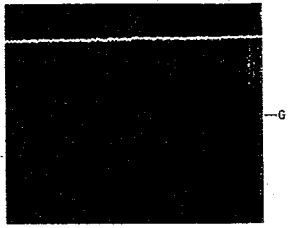
⑨ CH1: TEY 0.5V/div. 20ms/div.
⑪ CH2: TAO 0.5V/div.
Normal mode: PLAY



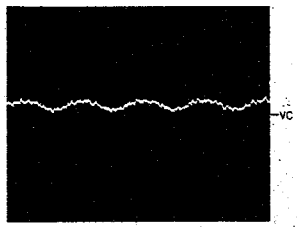
⑰ MDS 2V/div. 50μs/div.
PLAY



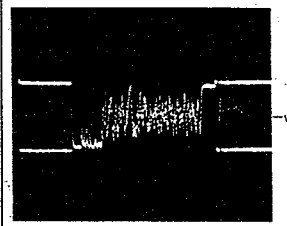
⑲ GFS 2V/div. 200μs/div.
PLAY



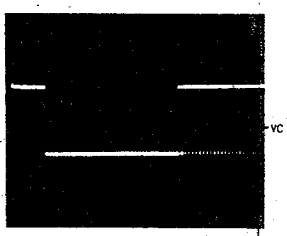
⑮ SPDLO 2V/div. 50ms/div.
PLAY



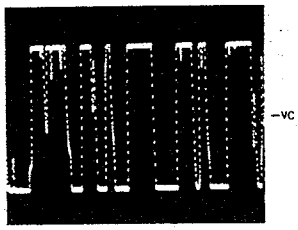
⑰ MDS 2V/div. 0.4S/div.
TRACK COUNT SEARCH



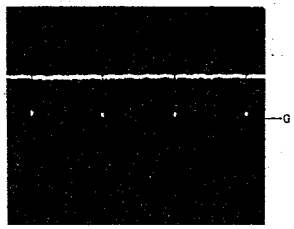
⑲ GFS 2V/div. 0.4S/div.
TRACK COUNT SEARCH



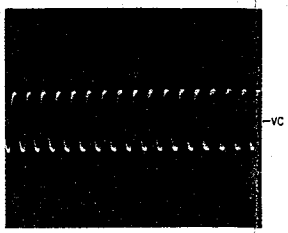
⑮ SPDLO 2V/div. 40ms/div.
12cm DISC TRACK COUNT SEARCH



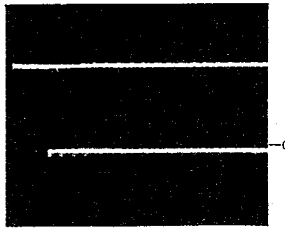
⑱ MDP 2V/div. 200μs/div.
PLAY



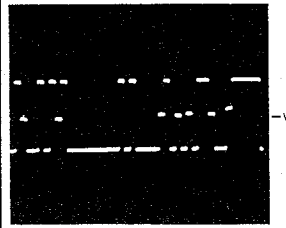
⑳ VCOO 2V/div. 0.2μs/div.
PLAY



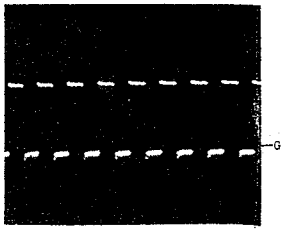
⑯ EFM 2V/div. 0.5μs/div.
PLAY



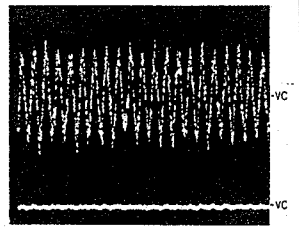
⑱ MDP 2V/div. 10ms/div.
TRACK COUNT SEARCH



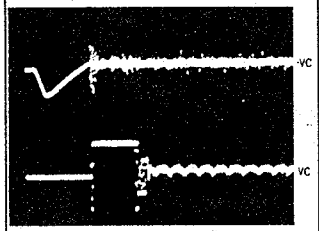
㉑ PLCK 2V/div. 0.2μs/div.
PLAY



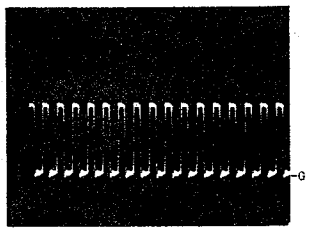
⑨CH1 : TEY 0.4V/div. 0.2ms/div.
⑪CH2 : TAO 0.4V/div.
TRACK COUNT SEARCH



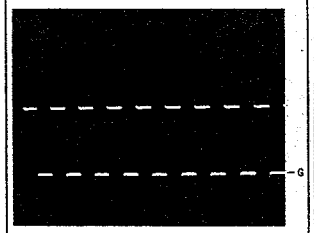
⑭CH1 : FEO2 1V/div. 0.2S/div
⑮CH2 : SPDLO 1V/div.
After 8cm disc loaded



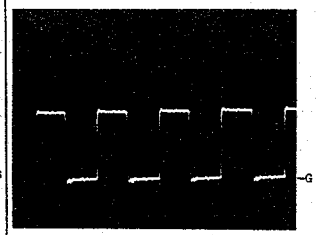
㉗BCLK2(IC704 Pin 9)
2V/div. 0.2μs/div.



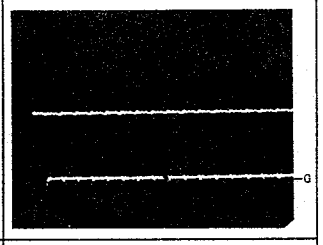
㉘LRCK(IC704 Pin 6)
2V/div.5μs/div.



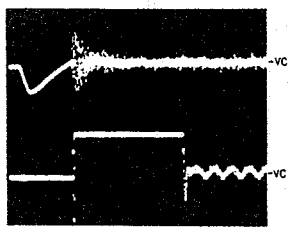
㉙BCLK1(IC703 Pin 7)
2V/div. 0.2μs/div.



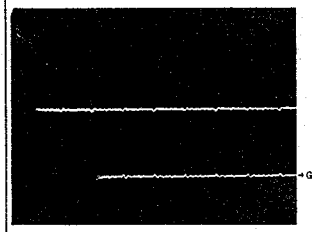
㉚DATA2(IC704 Pin 8)
2V/div. 0.2μs/div.



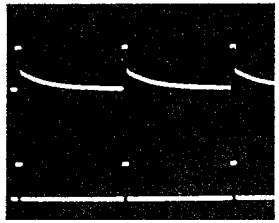
⑬CH1 : FEO2 1V/div. 0.2S/div.
⑮CH2 : SPDLO 1V/div.
After 12cm disc loaded



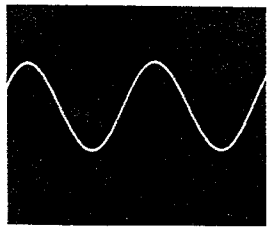
㉕DATA1(IC703 Pin 6)
2V/div. 0.2μs/div.



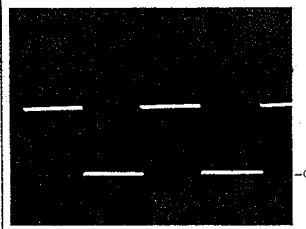
㉜CH1 : VM 4V/div. 10ms/div.
㉒CH2 : VMC 4V/div.
Test mode:No disc



㉔L or R out 0.5V/div. 0.2ms/div.
PLAY(When 1kHz FS)



㉖LRCK1(IC703 Pin 5)
2V/div. 5μs/div.



9. CHASSIS EXPLODED VIEW

NOTE:

- *Parts whose parts numbers are omitted are subject to being not supplied.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Mark	No.	Description	Part No.
	1	Button	CAC2091
	2	Grille Unit(UC)	CXA3259
		Grille Unit(EW)	CXA3257
	3	Button	CAC2089
	4	Cover	CNM2291
	5	Button	CAC2108
	6	Button	CAC2092
	7	Lens	CNV2176
	8	Button	CAC2090
	9	DIN Cord	CDE2721
	10	Resistor	RS1/2P102JL
	11	Cap	CNS1472
	12	Cord(UC)	CDE2723
		Cord(EW)	CDE2722
◉	13	Display Unit(UC)	CWX1218
		Display Unit(EW)	CWX1242
	14	Screw	BPZ20P060FMC
	15	Lamp(Amber)(UC)	CEL1025
		Lamp(Orange)(EW)	CEL1013
	16	Bush	CNV-724
	17	Lamp(Green)	CEL-147
	18	Insulator	
	19	P.C.Board	CNP2133
	20	LCD	CAW1050
	21	Holder	
	22	Plate	CNM2605
	23	Lens	CNV2174
	24	Holder	CNV2173
	25	Screw	PMS26P050FMC
◉	26	Main Unit	CWX1217
	27	Screw	BMZ30P050FMC
	28	Bracket	
	29	IC	L780S05
	30	Plug	
	31	Connector	CKS1087
	32	Plug	CKS1443
	33	Plug	CKS1436
	34	Screw	CBA1094
	35	Case	
	36	Insulator	
	37	Screw	BMZ26P040FMC
◉	38	CD Mechanism Unit	CXK2250
	39	Cushion	
	40	Screw	PMF26P060FMC
	41	Insulator	
	42	Chassis Unit	
	43	Holder	
	44	Holder	
	45	Screw	CMZ26P050FMC
	46	Holder	CNC1484
	47	Panel	CNS1911
	48	Handle	CNC1631
	49	Spring	CBH-865

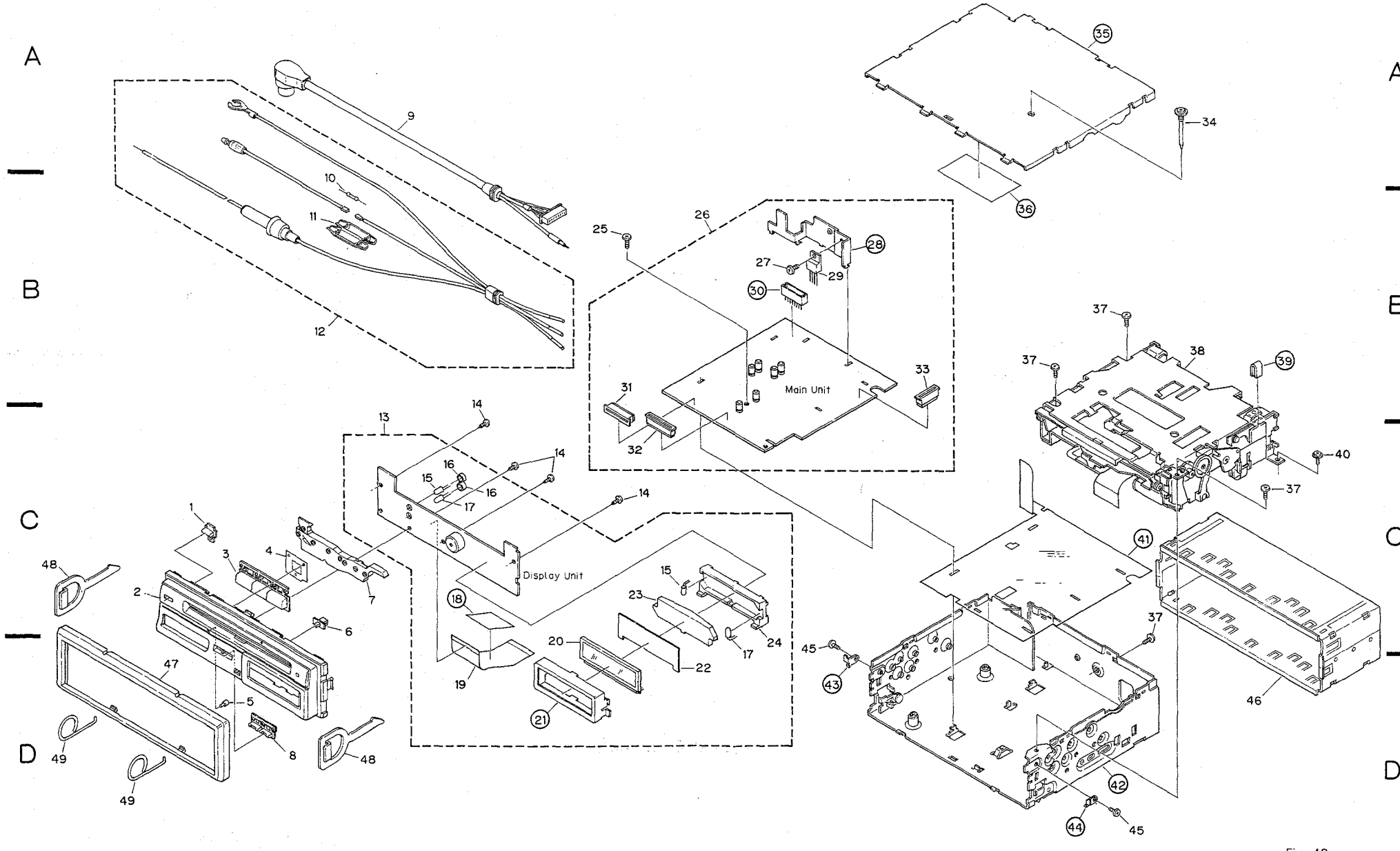


Fig. 43

10. CD MECHANISM EXPLODED VIEW

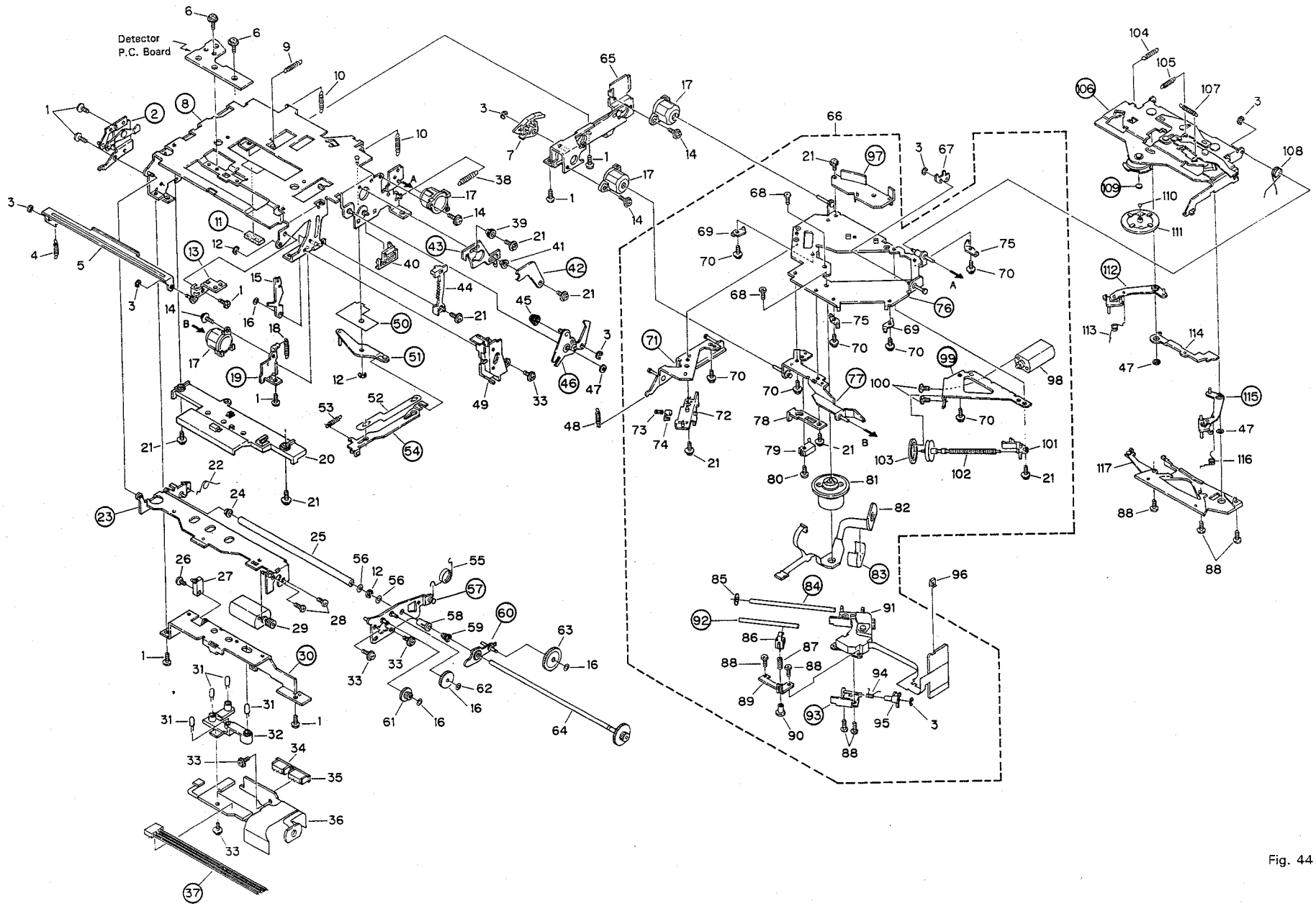


Fig. 44

Mark No.	Description	Part No.
1	Screw	BMZ26P030FMC
2	Bracket Unit	
3	Washer	YE15FUC
4	Spring	CBH1137
5	Arm	CNC2858
6	Screw	CBA1076
7	Arm Unit	CNV2256
8	Chassis Unit	
9	Spring	CBH1136
10	Spring	CBH1182
11	Cushion	
12	Washer	YE20FUC
13	Bracket Unit	
14	Screw	CBA1118
15	Cam	CNV1631
16	Washer	CBF-166
17	Damper Unit	CXA2148
18	Spring	CBH1182
19	Bracket	
20	Guide	CNV2221
21	Screw	CBA1075
22	Spring	CBH1299
23	Arm Unit	
24	Bearing	CNV1884
25	Roller	CNV2225
26	Screw	CBA1070
27	Switch	CSN1020
28	Screw	HBA-175
29	Motor Unit	CXA2129
30	Bracket	
31	LED	SLH-34VC3F
32	Holder	CNV2226
33	Screw	CBA1076
34	Connector	CKS-719
35	Connector	CKS-721
36	P.C.Board	CNP2178
37	Connector	
38	Spring	CBH1139
39	Collar	CLA1472
40	Holder	CNV1633
41	Collar	CLA1309
42	Holder	
43	Lever	
44	Gear	CNV2302
45	Spring	CBH1199
46	Arm Unit	
47	Washer	CBF1022
48	Spring	CBH1182
49	Cover	CNV2222
50	Spacer	
51	Arm Unit	
52	Spacer	CNM2152
53	Spring	CBH1134
54	Lever Unit	
55	Spring	CBH1133
56	Washer	HBF-126
57	Bracket Unit	
58	Bearing	CNV2224
59	Spring	CBH1181
60	Arm Unit	
61	Gear	CNV1627
62	Gear	CNV1628
63	Gear	CNV1629
64	Gear Unit	CXA2990
65	Bracket Unit	CXA2984
◉ 66	Carriage Mechanism Unit	CXA2980
67	Arm Unit	CXA3042
68	Screw	HBA-163
69	Holder	CNC1738
70	Screw	PMS20P030FMC
71	Bracket Unit	
72	Holder	CNV2230
73	Spring	CBH1104
74	Spacer	CNV1844
75	Holder	CNC1739
76	Chassis Unit	
77	Holder Unit	
78	Holder	CNV2229
79	Switch	CSN1018
80	Screw	CBA1070
81	Motor Unit	CXM1033
82	P.C.Board	CNP1709
83	Cover	
84	Shaft	
85	Cushion	CNV1863
86	Holder	CNV1512
87	Spring	CBH1105
88	Screw	CBA1062
89	Holder	CNC1736
90	Screw	CLA1319

Mark No.	Description	Part No.
91	PU Unit	CGY1009
92	Shaft	
93	Holder Unit	
94	Spring	CBH1106
95	Luck	CNV1513
96	Short Pin	CBL1010
97	Guide	
98	Motor Unit	CXA2133
99	Bracket	
100	Screw	CBA-098
101	Holder	CNV1781
102	Screw Unit	CXA2375
103	Belt	CNT1020
104	Spring	CBH1292
105	Spring	CBH1297
106	Arm Unit	
107	Spring	CBH1296
108	Spring	CBH1294
109	Spacer	
110	Ball	CNR1079
111	Clamper	CNV2411
112	Arm Unit	
113	Spring	CBH1293
114	Arm	CNV2228
115	Arm Unit	
116	Spring	CBH1295
117	Guide	CNV2223

11. PACKING METHOD

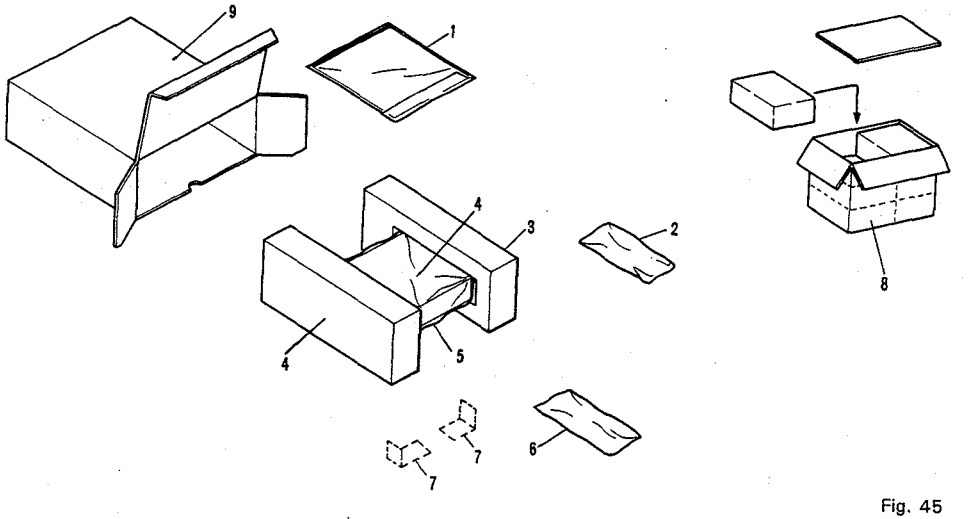


Fig. 45

Mark No.	Description	Part No.
1	Owner's Manual (UC) (English, French)	CRD1330
	Owner's Manual (EW) (English, French, German, Spanish, Swedish, Norwegian, Dutch, Italian, Finnish)	CRD1329
	Installation Manual Card	CRD1332
	Caution Card	
2	Panel	CNS1911
3	Styrofoam (R)	CHP1260
4	Styrofoam (L)	CHP1259
5	Polyethylene Bag	CEG-162
6	Accessory Assy	CEA1490
6-1	Spring (×2)	CBH-865
6-2	Handle (×2)	CNC1631
6-3	Strap	CNF-111
6-4	Bush	CNV1917
6-5	Screw (×1)	CBA1138
6-6	Screw Assy	
6-6-1	Screw (×4)	BMZ50P080FMC
6-6-2	Screw (×4)	CBA-102
6-6-3	Screw (×4)	CMZ50P080FMC
6-6-4	Screw (×1)	HMF40P080FUC
6-6-5	Screw (×4)	HMF40P080FZK
6-6-6	Nut (×4)	NF50FMC
7	Mounting Bracket	CNB1159
8	Contain Box (UC)	CHL1715
	Contain Box (EW)	CHL1714
9	Carton (UC)	CHG1715
	Carton (EW)	CHG1714

12. ELECTRICAL PARTS LIST

NOTE:

- ***Parts whose parts numbers are omitted are subject to being not supplied.***
- ***The part numbers shown below indicate chip components.***

Chip Resistor

RS1/8S□□□J, RS1/10S□□□J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

Unit Number :
Unit Name : Display Unit

MISCELLANEOUS

Mark	Circuit Symbol & No.	Part Name	Part No.
	IC 901		LC7582A
	Q 901 904	Chip Transistor	UN2211
	Q 902 903	Chip Transistor	2SB710
	D 901	LED	PRS724K
	D 902 903	LED (UC)	LN120C46-PA
	D 902 903	LED (EW)	LN120C56-PA
	D 904	Chip Diode	MA151WK-MT
	X 901	Buzzer	CPV1005
	IL 902 904	Lamp 14V 40mA (Green)	CEL-147
		LCD	CAW1050
	S 901 902 903 904 905 906 907	Switch	CSG1021
	S 908	Switch	CSH1012
	IL 901 903	Lamp 14V 40mA (Yellow) (UC)	CEL1025
	IL 901 903	Lamp 14V 40mA (Orange) (EW)	CEL1013

RESISTORS

Mark	Circuit Symbol & No.	Part Name	Part No.
	R 901		RS1/10S103J
	R 902		RS1/10S104J
	R 903 904 905 906		RS1/10S102J
	R 909		RS1/10S681J
	R 910		RS1/10S222J
	R 911 912		RS1/10S332J
	R 913 914		RS1/10S472J
	R 915 917 918 920 921 922 923 924		RS1/10S181J
	R 925		RS1/10S0R0J

CAPACITORS

Mark	Circuit Symbol & No.	Part Name	Part No.
	C 901		CCSQCH301J50
	C 902		CKSQYB103K50

Unit Number :
Unit Name : Main Unit

MISCELLANEOUS

Mark	Circuit Symbol & No.	Part Name	Part No.
	IC 351		CXA1081M
	IC 601		CXA1082BQ
	IC 655 657 661 662 706 707		M5218FP
	IC 663 664		LA6515
	IC 665 667 668 669		LA6501-FA
	IC 701		CXD1135Q
	IC 702		CXK5816M-15L
	IC 703		SM5807ES-W
	IC 704		LC7881NBM
	IC 705		μPC358G2
	IC 751		PD42178
	IC 752		M51955AFP
	IC 754		M54546AL
	IC 951		L7805CV
	Q 351 751 953		2SB1243
	Q 352 705 752 753 756 760 951	Chip Transistor	UN2211
	Q 601 701 754 755	Chip Transistor	UN2211
	Q 602 603 707 708 761	Chip Transistor	2SD1048
	Q 551	Chip Transistor	2SD1760F5
	Q 652 759	Chip Transistor	UN2111
	Q 653	Chip Transistor	2SC2712
	Q 702 706 754 755	Chip Transistor	UN2111
	Q 703 704	Chip Transistor	UN2215
	Q 757 758		2SD1859
	Q 762	Chip Transistor	2SD1048
	Q 952		2SC2458
	D 652		HZS11JB1
	D 653		ERA82-004VH
	D 661 662		HZS2ALL
	D 701 703	Chip Diode	MA151WA-MH
	D 702	Chip Diode	MA151WA-MH
	D 751 752	Chip Diode	MA151K-MH
	D 753		RD20JSB2
	D 754		HZ5LB1
	D 755		HZS6R8JB3
	D 761 951 952 953 955		ERA15-02VH
	D 762		HZS7R5JB2
	D 763	Chip Diode	MA151K-MH
	D 954	Chip Diode	MA3075
	L 951	Choke Coil	CTH-095
	TH 351	Thermister	CCX1001
	X 701	Crystal Resonator	CSS1052
	X 751	Ceramic Resonator	CSS-042
	VR 351	Semi-fixed	CCP1005
	VR 352	Semi-fixed	CCP1006
	VR 604	Semi-fixed 2.2kΩ (B)	CCP1015
	VR 651	Semi-fixed 47kΩ (B)	CCP1023

RESISTORS

Mark	Circuit Symbol & No.	Part Name	Part No.
	R 321 744 760 770 771 790 797		RS1/10S222J
	R 322		RS1/10S333J
	R 323 631 635 642 652 657 690		RS1/10S272J
	R 324 699 779		RS1/10S102J
	R 325 707 777		RS1/10S0R0J
	R 331 663		RS1/10S5R6J
	R 332 334 691 695 709 781 951 954		RS1/10S103J
	R 333 335 336 683 684 687 693 696		RS1/10S2R2J
	R 341		RD1/4PS221JL
	R 344 623 637 643 673 765		RS1/10S473J
	R 345		RS1/10S472J
	R 351		RD1/4PS120JL
	R 352		RD1/4PS100JL
	R 353 381 651 653 655 658 659 723 724 740		RS1/10S102J
	R 354 378 618 628		RS1/10S153J
	R 355		RS1/10S113J
	R 356 357		RS1/10S563J
	R 358 359 669		RS1/10S563J
	R 360		RS1/10S124J
	R 361		RS1/10S124J
	R 362 763		RS1/10S564J
	R 363		RD1/4PS223JL
	R 364 365 618 671		RS1/10S105J
	R 366		RS1/10S562J
	R 367 614 774 786		RS1/10S104J
	R 377 769		RS1/10S562J
	R 379 705		RS1/10S332J
	R 380		RS1/10S203J
	R 382		RS1/10S363J
	R 383 685		RS1/10S823J
	R 384 630 666		RS1/10S273J
	R 601 602		RS1/10S101J
	R 606		RS1/10S224J
	R 607		RS1/10S683J
	R 608		RS1/10S823J
	R 609 619		RS1/10S104J
	R 610 625		RS1/10S113J
	R 611		RS1/10S432J
	R 612		RS1/10S623J
	R 613		RS1/10S624J

Mark	Circuit Symbol & No.	Part Name	Part No.
R	617		RS1/10S203J
R	620 654 656 660		RS1/10S272J
R	621		RS1/10S184J
R	622 670 755 768 783 785		RS1/10S103J
R	624		RS1/10S393J
R	627 725 726 773 780		RS1/10S104J
R	634		RS1/10S474J
R	635		RS1/10S752J
R	641		RS1/10S113J
R	651 664 679 776		RD1/4PS103JL
R	662 675 678 680 688 689 692 703 751 752		RS1/10S103J
R	665		RS1/10S392J
R	667		RS1/10S223J
R	668		RS1/10S183J
R	672		RS1/10S364J
R	674		RS1/10S153J
R	676 677		RD1/4PS201JL
R	681 682		RD1/4PS2R2JL
R	686 698		RS1/10S223J
R	694		RS1/10S822J
R	697 782 953		RS1/10S473J
R	704 729 955		RS1/10S472J
R	706		RS1/10S0R0J
R	711 712 719 720		RS1/10S511J
R	713 714		RS1/10S181J
R	715 716		RS1/10S244J
R	717 718		RS1/10S102J
R	721 722		RS1/10S822J
R	730		RS1/10S682J
R	731 732 733 734 735 736 737 738 4.7kΩ		CCN-140
R	741 742		RS1/10S182J
R	743 761 762 775 792		RS1/10S222J
R	745 746		RS1/10S152J
R	747		RS1/10S391J
R	748 753 756 766 767		RS1/10S681J
R	757 758		RD1/4PS472JL
R	759 772 791 793		RD1/4PS104JL
R	764		RS1/10S683J
R	789		RS1/10S821J
R	798 799		RS1/10S151J
R	952		RD1/4PS271JL
R	956		RD1/4PS222JL

CAPACITORS

Mark	Circuit Symbol & No.	Part Name	Part No.
C	351 707 708 722 737 738 755 760		CEA101M6R3LS
C	352 672 676 683 710 730 754 758		CKSQYB103K50
C	353 654		CKSQYB333K25
C	354		CASA150M6R3
C	355 611 625 626 652 682 724 759		CKSQYB103K50
C	356		CKSQYB332K50
C	357 358 359 614 630 663 664		CKSYB224K25
C	360 361 651 653		CKSYB224K25
C	370 373		CCSQCH220J50
C	371 615		CKSQYB102K50
C	372		CCSQCH150J50
C	601		CKSQYB222K50
C	605 656		CKSYB104K25
C	606 616		CEA220M16LS
C	607 668 669 675 677		CKSYB473K50
C	608		CEALNP220M6R3
C	609 715 716 756		CKSQYB472K50
C	610		CCSQCH221J50
C	612 620 678 701 705 706		CKSYB104K25
C	613		CKSQYB333K25
C	617		CEA4R7M50LS
C	618		CKSQYB682K50
C	619		CKSQYB182K50
C	621		CEALNP4R7M35
C	623		CKSQYB272K50
C	624		CCSQCH391J50
C	627		CCSQCH220J50
C	655		CCSQSL681J50
C	657		CKSYB393K25
C	659 662		CEA100M25LS
C	660		CASA100M6R3
C	661 954	470μF/16V	CCH-114
C	665 666 671 673		CKSYB224K25
C	703 704		CCSQCH090D50
C	709 740 751		CKSYB103K50
C	711 712		CEALNP330M10
C	713 714		CKSYB683K25
C	717 718		CCSQCH471J50
C	719 720		CKSQYB822K50
C	731 732		CCSQCH331J50
C	733 734		CCSQCH331J50
C	735 736		CEA330M6R3LS
C	752 753		CCSQCH300J50
C	757		CEA6R8M35LS
C	951 958		CEA102M16L2
C	952	EMI Filter	CCG1006
C	956		CEA221M10L2
C	957		CEA470M16L2

Unit Number :
Unit Name : Carriage P.C.Board

Mark	Circuit Symbol & No.	Part Name	Part No.
M	831	Motor Unit(Spindle)	CXM1033
M	832	Motor Unit(Carriage)	CXA2133
S	831	Switch(Home)	CSN1018

Unit Number :
Unit Name : Mechanism P.C.Board

Mark	Circuit Symbol & No.	Part Name	Part No.
D	831 832 833 834	LED(Disc detect)	SLH-34VC3F
M	833	Motor Unit(Loading)	CXA2129
S	832	Switch(Disc set)	CSN1020

Unit Number :
Unit Name : Detector P.C.Board

Mark	Circuit Symbol & No.	Part Name	Part No.
Q	831 832 833 834	Photo-transistor	PH102

Miscellaneous Parts List

Mark	Circuit Symbol & No.	Part Name	Part No.
		PU Unit	CGY1009